Products finishing

FRED W. VOGEL, Editor
(On leave of absence in the U. S. Armed Forces)

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Products Finishing

SURROGATES

They say that the Devil is mixing a highball
Of fire and brimstone and Ack-Ack,
To serve as an Ersatz for Adolf the Screwball
To take in the place of his cognac.

IT IS unfortunate that many of us seem to have borrowed a term from our Nazi enemies in speaking of material shortages caused by the present war. We have substituted chicory for coffee and called it Ersatz. We have accepted Ersatz beef, Ersatz butter, Ersatz this and Ersatz that; yet all the time we have had available the perfectly good American word "surrogate."

In the field of metal finishing, surrogates have come to the fore conspicuously in electroplating. It became early apparent that supplies of tin, nickel and cadmium were so inadequate that substitutes must be found in order to avoid disaster. In most instances substitutes have been found, either in the form of different metals or of more economical and efficient deposition of the same metals. It is our purpose here to enumerate a few of the most important of these surrogates.

The substitution of zinc for cadmium, while it may have given many a plater more than one headache, is generally speaking a sound and feasible undertaking. The two metals are associated in nature, are chemically similar, and in general offer equivalent protection for the same thickness of plate. In a great many instances, zinc coatings are actually superior to those of cadmium. The tendency for zinc to corrode in a marine atmosphere is greatly reduced by application of the Cronak dip. Of the zinc solutions now in use the acid bath is the less expensive, but the cyanide bath offers the greater throwing power.

Where nickel is used primarily for its wear-resisting ability, a possible substitute is chromium. The restrictions on chromium thus far have been relatively light, inasmuch as the chromic acid used is from low grade chromium ore. For other purposes either silver or indium or both are satisfactory surrogates for nickel. A nickel coating to be of any value must have a thickness of at least 0.0002 inch, which limits the extent to which plates may be reduced. Another very promising surrogate is palladium, which in color and hardness compares favorably with nickel.

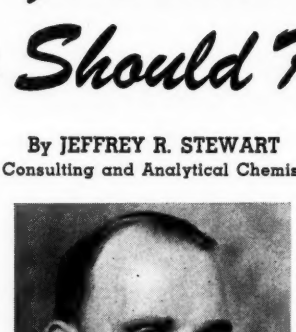
Lead, which may be plated either from the fluoborate solution or from the sulfamate bath, has in many cases proved satisfactory as a substitute for tin. In other cases zinc has been substituted successfully. Copper has been employed as a surrogate for tin where the latter had been used to stop off nitriding. A noteworthy advance in technique consists of the conversion from hot dip tin to electrodeposited tin, which has resulted in thinner and more uniform coatings.

It is obvious from the above that, enemy propaganda notwithstanding, we have not been caught entirely napping. In the final analysis it is a tribute to American versatility that we have never failed to find a way out of a dilemma. I am confident that we never will.

Bryant W. Pocock

Wrinkle Finishes -- What You Should Know

By JEFFREY R. STEWART
Consulting and Analytical Chemist



This article is the first in a series written by Jeffrey R. Stewart on the subject of wrinkle finishes. Mr. Stewart, an expert in the field of paint research and author of "The National Paint Dictionary," has recently been added to the staff of PRODUCTS FINISHING as a consulting editor. He was formerly associated as research chemist with Dr. Henry A. Gardner of the National Paint, Varnish & Lacquer Association. At present Mr. Stewart operates a private consulting laboratory in Washington, D. C., under the name of the Stewart Research Laboratory. He has been named as a Fellow in the American Institute of Chemists and is doing special research work at George Washington University.

THE recent demands for the protection and decoration of metals without the use of plating has brought wrinkle finishing well to the foreground in the metal finishing industry. In this series of articles, the author will try to tell you some of his experiences while working in the laboratory and spray shop with wrinkle finishes during the past five years, featuring a progressive development in the various discussions. In other words, an attempt will be made to start out with the simplest or more elementary expressions, and then gradually progress into the more detailed or scientific phases of the subject. This, it is hoped, is really what you readers want.

Let us start out with a definition of wrinkle finishes. A wrinkle finish is an enamel or lacquer which, when applied as a film under certain conditions, exhibits a novelty effect very similar to fine wrinkles or irregular ridges. They are produced in almost every color, and the texture of the wrinkle is usually available in a wide range of patterns. Although most wrinkle finishes are of the baking type, sometimes air-dry finishes are used. They are almost always considered as a one-coat application. Various modifications of wrinkle finishes are known under such names as "fingerprint," "shrivel," "ripple," "crinkle," "Morocco," and so forth. Although wrinkle finishes are primarily used because they exhibit a pleasing optical effect, they are also employed because of their resistance to abrasion, impact, and general handling. Heat and certain atmospheric conditions are usually required for the formation of uniform wrinkles.

There are certain fundamental or elementary things that we should

know about wrinkle finishes before making a more detailed study. For instance, it is generally presumed that such finishes are used primarily on metal, and only on rare occasions are applied to wood, plastics, and fabrics. Let us assume, therefore, that this discussion deals only with application to metallic objects such as iron, steel, aluminum and various alloys. One important feature to remember is that wrinkle finishes have many advantages; by virtue of their resultant rough or irregular finish, little or no surface preparation of the metal is required thus saving considerable time, materials, and expense.

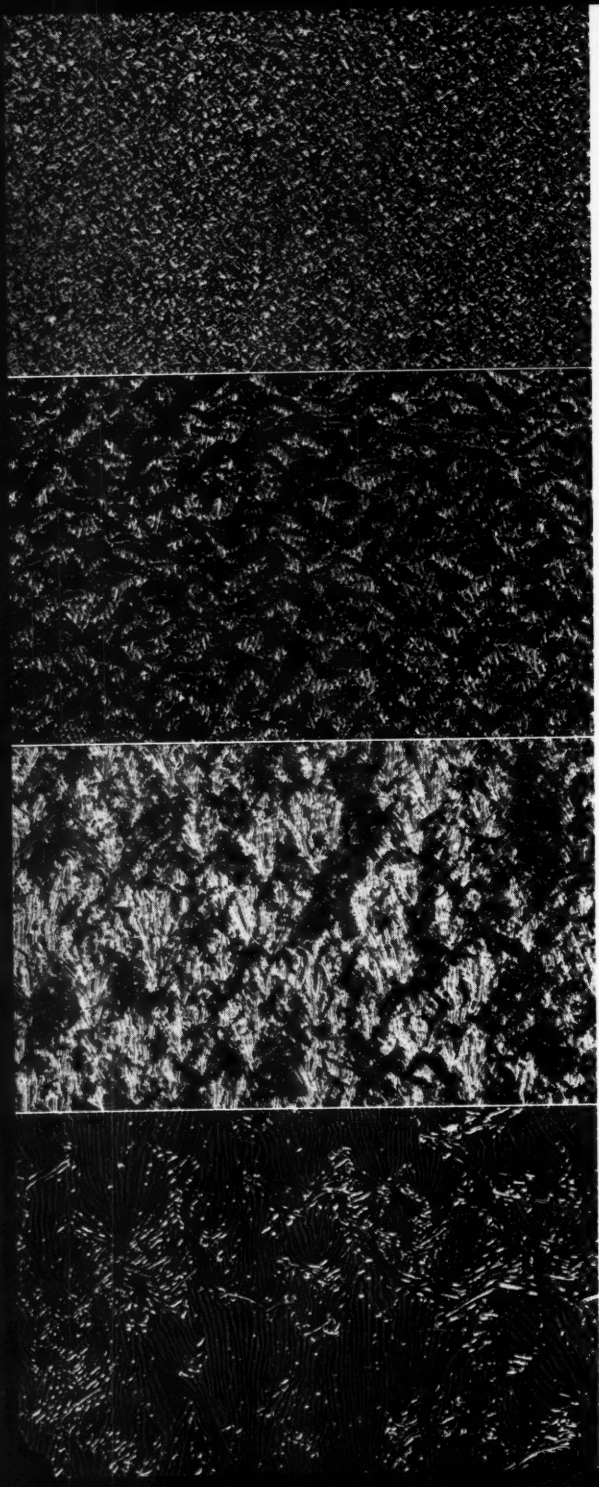
Since the viscosity of wrinkle finishes is usually much greater than ordinary baking enamels, it is often necessary to use pressure feed when applying by spray gun. This consistency is really a very important factor, because the size or texture of the resultant wrinkled film is largely affected by it. The illustrations herewith show this quite clearly. In other words, the heavier the body or consistency of the liquid film, the coarser will be the film upon application. Conversely, the more liquid or the lower the consistency as it leaves the spray gun, the finer the resultant wrinkles. As a matter of fact, if the consistency is too low, the film may not wrinkle at all. You will note later in this article, when we discuss the specifications, that consistency is an important consideration.

Most of the wrinkle finishes on the market today can also be applied by brush instead of the spray gun, although the latter is, by far, the more popular method of application. Where wartime speed on the production line is of utmost importance, it is obvious why application by brush is not very popular.

In subsequent paragraphs, the author will give you the conclusions of his investigations conducted in the laboratory and in the spray shop. If any questions arise regarding the methods employed in making the various tests and evaluations, the author will be glad to answer any queries.

Several years ago, when wrinkle finishes first appeared on the market, there were numerous difficulties encountered by the spray mechanics. The biggest trouble was the inability to get uniformity of the wrinkle texture. It was quite common for large orders of industrial products to be rejected by inspectors because the texture or size of the wrinkles did not match the established standard. In order to remedy this difficulty, many investigations were carried on both by private testing laboratories and by the manufacturers of the finishes. Both of these groups necessarily had to enlist the cooperation of the men (the consumers or industrial finishers) who were responsible for the application and standardization of materials. However, a great deal of man hours were wasted and a lot of unnecessary money spent merely because the work was being duplicated and no means was provided for coordination of the work. However, when competitors have a common problem before them, it is often difficult to get them together to avoid duplication of their efforts. For this reason, there was a great deal of scattered information and data that would be of value to the industry at large. The remedy to many of these problems was the expansion of the New Wrinkle, Inc., patent system. This company probably now has something like 75 patents in the United States, Canada and foreign countries, with several others pending in this country. About five years ago, it acquired the Wrinkle patents of the Chadeloid Chemical Co., the Kay and Ess Chemical Corp., the Kay and Ess Co., The American Cyanamid Co., and the Flood & Conklin Co.

The primary objective of New Wrinkle, Inc., it seems, is to create an acceptance for wrinkle finishes as a



The two panels at the top represent a black wrinkle finish as applied by spray gun. The films have the same composition. However, the film shown in the panel at the top represents a finish which was thinned 10 per cent and therefore had a lower consistency and resultant finer texture. The film shown on the panel below it represents the sprayed wrinkle finish just as it comes from the container without added thinner. The third and fourth panels also show types of wrinkle finish, the bottom one being designated as "sag" wrinkle finish.

standard coating, rather than to consider them as a special material. This, it was originally planned, was to be accomplished by the sensible attitude of creating or developing a wider use and demand for these finishes. Another purpose of this organization was to render the service of solving specific and general problems which are brought up by customers of the company's licensees. This system has been responsible for less confusion and greater progress of these types of finishes than any other organization in America.

It will be found when first encountering the characteristics of wrinkle finishes that there are many tests to be considered. These will be divided into several sections and discussed separately.

Consistency or Body

It is suggested that we refrain from the use of the word "viscosity" in describing the consistency or body of wrinkle finishes. The reason for this is that these finishes are r e a l l y not fundamentally viscous in nature, due to

the pigmentation. The author likes to reserve the word "viscosity" for transparent liquids, and, of course,

Wrinkle finish has proved very satisfactory on unit heaters such as the one shown here. *(Photo courtesy Young Radiator Company)*

nearly all wrinkle finishes are opaque as a result of their pigment content. Since the effect of consistency on the appearance of the finished film has already been pointed out, we can pretty well agree that some control of this property is rather important. We could tell you about 20 different types of instruments for measuring consistency but will refrain from doing so, because only a few of them are of sufficient importance for such industrial products. Both producers and consumers of wrinkle finishes will agree that some type of test should be used, but they also agree that the method must not be too involved and the instrument must not be too complicated or expensive. For this reason, the various viscosity cups are considered most desirable. In particular, there are the consistency cups used by Westinghouse, General Electric, the American Society for Testing Materials, and du Pont. Specifications for minimum and maximum consistency vary considerably. In general, however, an average of between 45 and 55 seconds-units is considered most desirable. In cases where the wrinkle finish is to be applied by the dipping process instead of by spray gun, it is even more important to control the consistency within certain limits. If the material does not contain sufficient extra thinner, it will not be sufficiently liquid to exhibit a "clean drip." Conversely, if too much thinner is added, the film will be too liquid and it is possible that the film will not wrinkle at all.

Baking Time and Temperatures

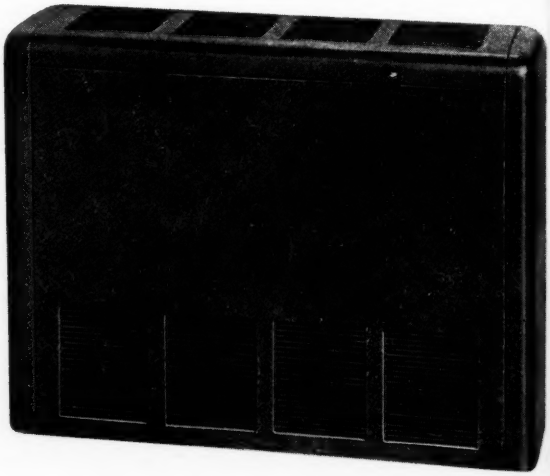
Generally speaking, the baking time and baking temperature will depend largely on the type of formulation used by the manufacturer. It is, of course, always best to follow the recommendations suggested by the producer, rather than to arbitrarily decide on some "hit or miss" baking schedule. In experimenting with various baking schedules, it was found that it is a very rare thing to effect an improvement on the recommendation made by the manufacturer. In general, it can be said that the synthetic type of wrinkle finish usually requires a shorter baking time than the oil type. However, with regard to the oven temperature, there is not a substantial difference in the values for the two different types. Various manufacturers will, of course, have different baking schedules. Hilo Varnish Co., for instance, suggests a baking time of one and one-half hours at 225 deg. F. for its fine gloss synthetic baking enamel, whereas with its air-drying wrinkle finish (oil type), it is optional to either air dry or to bake for four hours at 120 deg. F. Felton, Sibley & Company normally recommends that its wrinkle finish (glycerol phthalate type) be baked for two hours at 200 deg. F., but the company also states that the schedule can be

speeded or retarded by baking for three hours at 180 deg. F. or by baking for one and one-half hours at 250 deg. F. The Zapon Division of the Atlas Powder Co. has a similar black wrinkle finish which requires either a one and one-half hour bake at 275 deg. F. or a one hour bake at 300 deg. F. A comparable product is supplied by the Sherwin-Williams Company and this organization has even gone so far as to supply a chart which shows how long the material should be baked for temperatures ranging all the way from 200 deg. F. to 325 deg. F. Roxalin Flexible Finishes, Inc., markets a similar product, and cuts its baking time as low as 45 minutes and recommends a temperature of 275 deg. F. The author tested black wrinkle finishes as produced by Gilbert Spruance Co. and found that its recommendations of baking for one hour at 250 deg. F. are the optimum conditions in this test.

From the foregoing, it can be seen that there is really no definite or universal baking schedule that could be applied with guaranteed satisfaction. In the absence of any recommended baking schedule, it would be best to start on an experimental basis with a one hour bake at 250 deg. F. and then vary the time and temperature to give the desired type of wrinkling effect. There is one important thing to remember regarding baking schedules, and that is the fact that there is probably no other factor (with the possible exception of consistency) that is responsible for the general appearance of the final film. Some of the wrinkle finishes now on the market will give a higher gloss if the baking temperature is reduced even in the amount of 20 to 25 deg. F. Dulling or discoloration may result by the use of too high a temperature. There are many, many properties that are directly affected by the baking schedule and, for this reason, it is a good policy to adhere to the specification regarding time of baking and oven temperature.

A recent patent discloses information regarding a wrinkle finish that can be baked for as short a time as 30 minutes, using a temperature of 250 deg. F. This is accomplished by dispersing an oil-soluble resin in an oil-modified alkyd resin at a temperature just below the point where the alkyd becomes over-condensed. This is known as the Moore Process. In another section of this series, the patent situation will be discussed in greater detail after the author has had an opportunity to collect all the pertinent patent literature on this important subject.

When changing from a gas-fired oven to an electric oven, or vice versa,



An attractive, durable finish is attained by the use of wrinkle finish on this forced draft convector unit.
(Photo courtesy Young Radiator Company)

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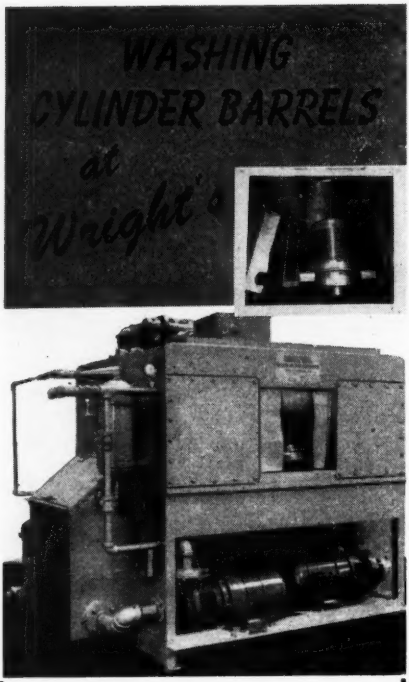

Four INDUSTRIAL Washing Machines of the type shown above are washing, rinsing, and blowing off cylinder barrels at the Wright Aeronautical Corporation.

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it is frequently necessary to modify the baking schedule. The lack of correlative data between different testing laboratories and spray shops is due to the fact that some use gas ovens and others use electric ovens. This often causes a marked difference in the general appearance of the final wrinkled film.

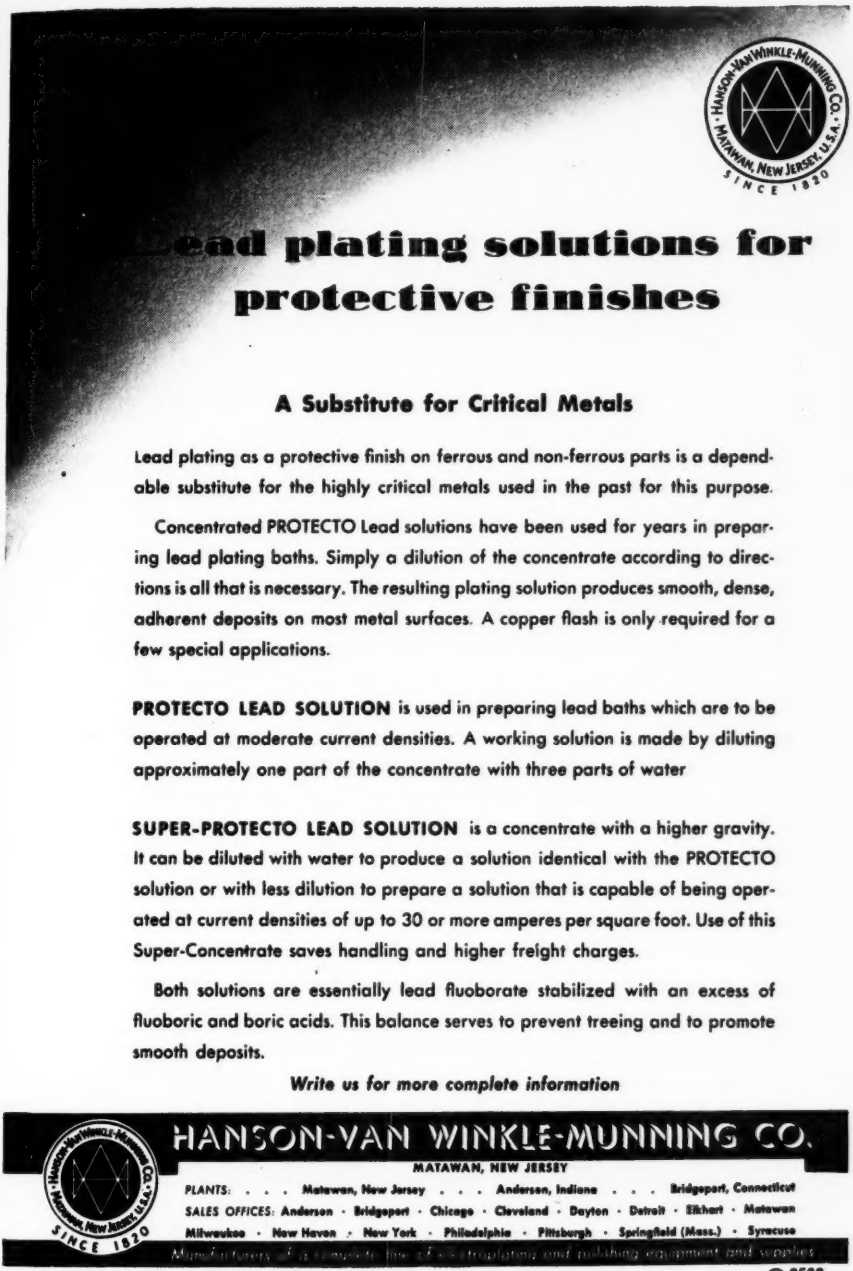
In some of the specifications of the larger consumers of wrinkle finishes, there is a section stating that the objects which are coated with the wrinkle finish must not be handled until 48 hours after the material has been withdrawn from the oven. In many cases, this requirement is being waived or relaxed due to the speed that is associated with the present wartime activity. If it is not being entirely waived, it is, in many plants, being shortened to 12 or 24 hours. Needless to say, extra care must be exercised by the employees who handle the parts in order to prevent damage to the comparatively soft film and subsequent rejection by the inspectors.

(To be continued next month)

Cellulose Chemistry. By Mark Plunguian, Ph.D. Published by Chemical Publishing Company, 234 King St., Brooklyn, N. Y. 112 pages, 5½ x 8½ inches, 13 illustrations. Price, $2.25.

This book was designed primarily to meet the requirements of noncellulose chemists for a brief and up-to-date introduction to the chemistry of cellulose. An effort has been made to achieve a comprehensive outline of modern cellulose chemistry through a concentration of pertinent detail. The book is written largely for the chemist who is beginning in this field or working in allied fields.

Topics covered include the following: Cellulose and Associated Substances; Microstructure of Cotton and Wood Fibers; Isolation and Purification of Cellulose; General Properties of Cellulose; Dispersion of Cellulose, Derivatives of Cellulose; Modified Cellulose; Constitution of Cellulose, and Micellar Structure of Cellulose.



Lead plating solutions for protective finishes

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Adherence of Abrasives to Polishing Wheels

By HENRY R. POWER
The Carborundum Company, Niagara Falls, New York

IN preparing a polishing wheel of maximum efficiency the polisher must deal with forces residing at the interface between the glue (or silicate of soda) film and the cloth of which the wheel is made, also those that occur between the adhesive film and the abrasive grains which are applied at the periphery of the wheel. These forces determine the specific adhesion between the glue film and the respective surfaces of the fabric and the abrasive grains. The distance over which these forces can act is obviously very short and probably is confined to several molecular layers of components in the adhesive, such as animal glue or silicate of soda. Such measurement comprises only a minute thickness of the adhesive film.

Since the surfaces of both the cloth and the abrasive grains are fixed, mobility for the adhesive film must be provided in order to control these forces. With animal glue, which is rigid when cold, mobility is assured by the use of a solvent (water) and by heat. Silicate of soda is fluid and mobile when cold, and because the solvent (water) gradually evaporates, the desired orientation takes place and adhesion is developed. In addition, heating of the abrasive grains by the polisher also promotes a high order of adhesion.

Although specific adhesion has not been measured directly up to this time, other factors which are of more practical importance in determining the net adherence of the adhesive film to both the cloth of the polishing wheel and the surface of the abrasive grains have been investigated. Solid substrates (the bodies to which the adhesive film is affixed), which in this case are the cloth of the polishing wheel and the abrasive grain, are classed, for convenience, as open, sorptive and compact dense structures.

Unusually excellent adhesion is attainable with solids which have sorptive surfaces, such as fabrics and woods, as employed by the veneering industry. The limit of the adhesive value in such cases is usually the fibrous surface layer of the substrate. For instance, blocks of wood held by a glue film often split in the body of the wood rather than at the joint. A glue film drying on thin flakes of certain abrasives often shatters the surface. This happens because the adhesion of the film is higher than the cohesion of the substrate to which the film is attached. The cohesional strength of the film itself determines the ultimate adherence that it is possible to get with a film-forming material. Oil paints are weaker than lacquer films and these, in turn, are much weaker than glue films, the

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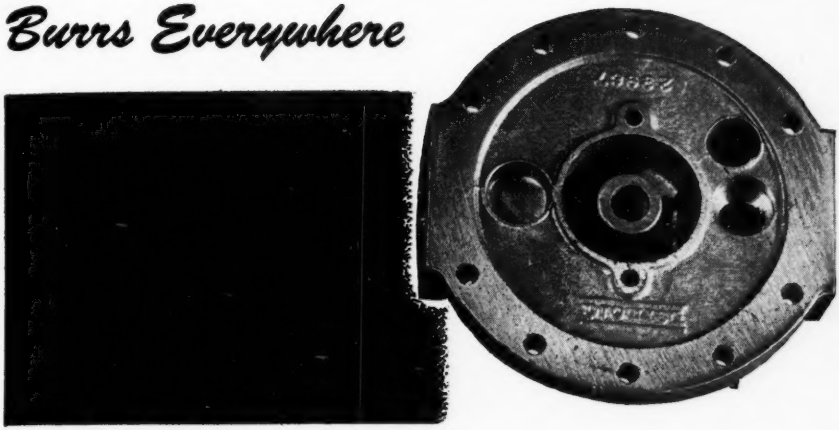

Cuno Engineering Company of Meriden, Connecticut, makes oil filters . . . those highly efficient filters used on airplanes and tanks. And their efficiency is due in large part to the successful utilization of the principle of "edge filtration." Oil passes between specially shaped discs compressed almost solid on rods.

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Note the many burrs in the castings pictured above. Imagine the task this would be if all the work were done by hand. Imagine the difficulty of maintaining tolerances in the measurements, if the burring were done with files or metal burrs.

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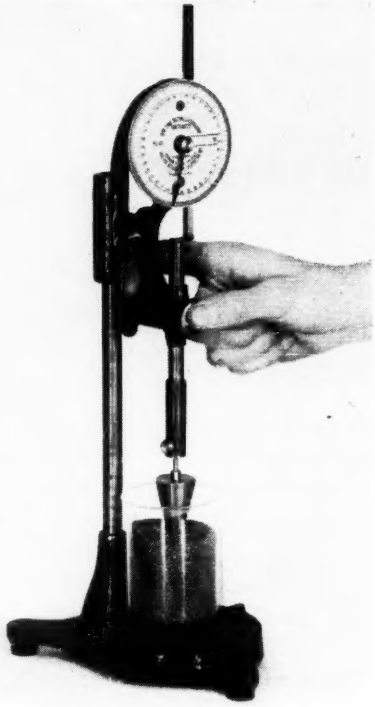
tensile strength of which may be as high as 10,000 pounds per square inch.

In the case of solids having a compact surface like abrasives, metals, glass and resinoids, the adherence of films to their surface varies widely. The differences in adhesion value shown by solid bodies with one and the same adhesive film is often associated with the differences in the surface roughness of the solid. In cases when abrasive grains are used on a polishing wheel, a glue film on the surface of the abrasives is strong and gives efficient and economical polishing results, provided the abrasive has been properly prepared by the manufacturer who etches the surface of each and every granule. This is popularly known as "surface tenacity" in the polishing trade.



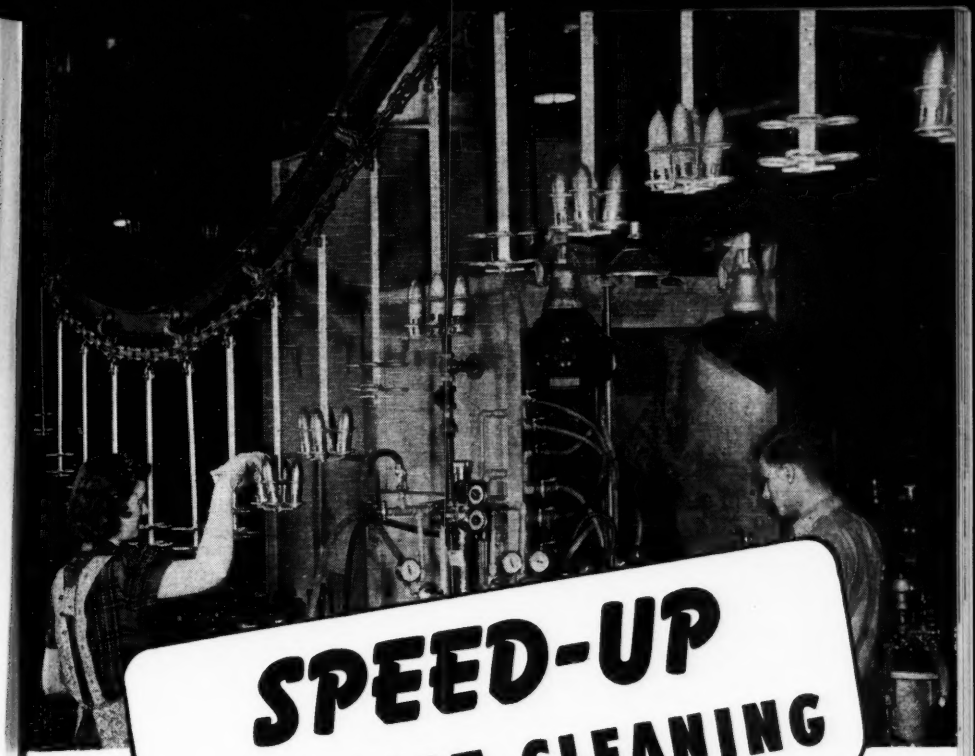
Penetrometer Used in Packing Test

Modern abrasives as made in electric furnaces, that show good adhesion with glue or silicate of soda films, often can be improved for greater adhesion by removing extraneous materials that may interfere with maximum adhesion. To measure the net adhesional effect (since specific adhesion cannot be directly measured), briquettes of glue and abrasive have been made and cured and broken on tensile strength machines in testing laboratories.

While it is difficult to measure particulate materials like abrasive grains, any increase in surface area that results from proper development of the surface tenacity for the benefit of the polishing grain user will aid in accomplishing results similar to those supplied on continuous metal surfaces that have been roughened by blasting, etching, or sanding with coated abrasives. In such cases, the increase of the surface area has been found to be twenty-five fold. A good method for determining this is to allow a fine-pointed stylus to ride lightly over the contour of the roughened surface and to record the tracing at high magnification.

In the case of abrasive grains a qualitative test can be made for proving the increased surface area of treated abrasive grains. This is known as the "packing test" and consists of dropping a cone into a container of abrasive and then noting the impedance of the abrasive to the movement of the cone.

BUY WAR STAMPS AND BONDS.



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Prolong Instrument Life

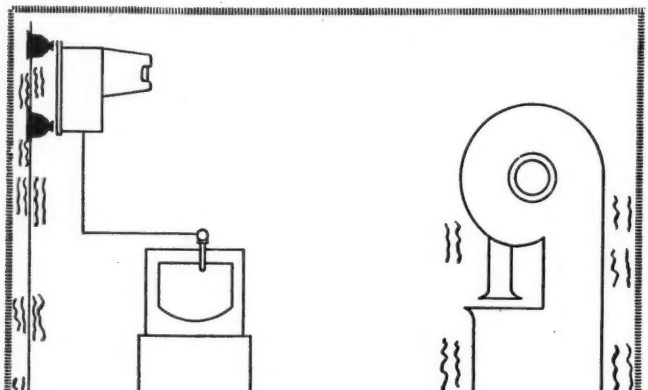
By THEODORE A. COHEN
Chief Engineer, Wheelco Instruments Co.
Chicago, Illinois

INSTRUMENTS have, in recent years, found many and unusual applications in metal finishing industries. They are being applied to reduce labor costs and manufacturing processes, to lower fuel costs through exact control, to speed production, and to improve product quality and eliminate spoilage or rejects.

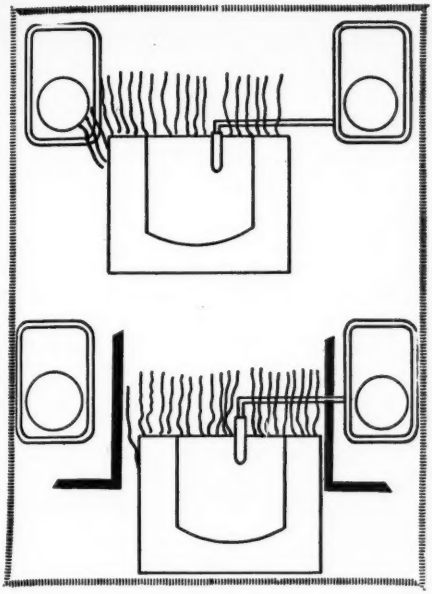
Continued enjoyment of these benefits is dependent, to a large degree, upon proper care of instruments now installed, whether they are doing 24-hour service in defense plants or normal service in non-defense industries. Shortages of critical materials are necessitating substitutions in components of many instruments, while heavy demands upon manufacturers are slowing delivery of certain types regardless of the priority commanded by the purchaser. Needs of defense industries make delivery of instruments impossible to many other companies wishing them.

Steps that can be taken to prolong the life of industrial instruments, regardless of manufacture, are outlined in this article. This information should be supplemented by careful study of instructions furnished by the manufacturer of each instrument to make sure the equipment is installed and operated according to the manufacturer's recommendations. If such instructions have been mislaid or lost, model and serial numbers of the instruments should be sent to the manufacturer with a request for new instructions.

CENTRALIZE RESPONSIBILITY All instruments in a plant should be the responsibility of one man, or a group of men, depending upon the number of instruments used. Responsibility for instrument care and maintenance should not be left



Rubber mounts will dampen instrument vibration induced by machinery or equipment in the plant.



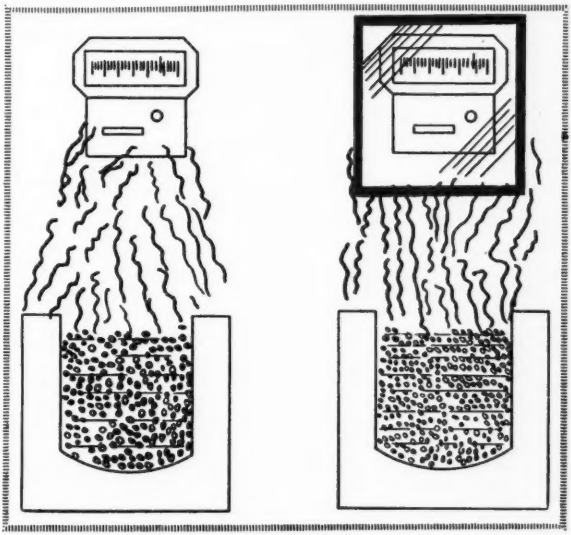
Shields should be used to insulate instruments from heat radiated from furnaces, ovens or processing equipment. Accuracy of the instruments shown at the top will be affected by heat radiated from the equipment, while those shown schematically below have been given protection.

•

to the men operating the equipment on which they are installed, as this practice will result in complete lack of maintenance until instrument breakdown, or in unnecessary or harmful tampering by individuals unfamiliar with instrument operation.

LOCATE PROPERLY Improper location and improper installation of industrial instruments probably cause more trouble and inaccuracy than fault or failure in the instruments themselves. It is as important that instruments be installed where they can be properly serviced and protected, as it is to install them where the bulb, thermocouple, photoelectric cell, radiation head or other "sensing" unit can reach the temperature, pressure, vacuum or other condition the instrument is to measure.

ELIMINATE VIBRATION Prolonged vibration, or shock resulting from careless handling, are chief causes of instrument failure. Installing instruments on vibration mounts will minimize the effects of vibration. A better method is to mount instruments in locations where vibration is not present. Instruments should not be mounted upon moving



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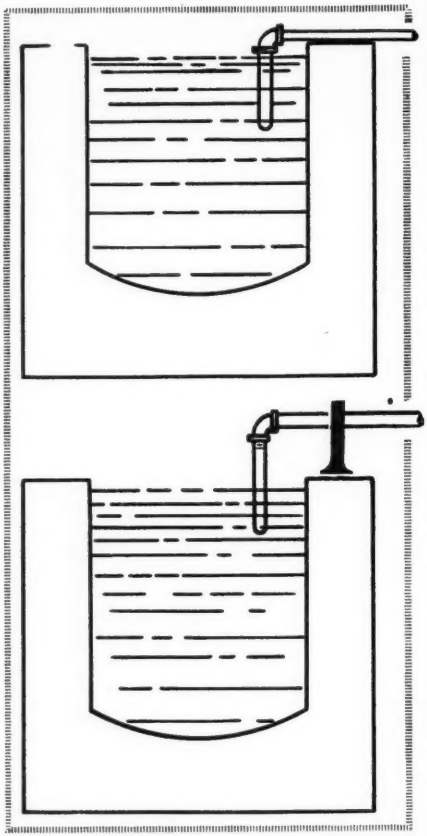
Instruments in corrosive atmospheres should be protected by vapor-tight cases. The instrument at the left will give poor performance and have short life, as compared to the instrument protected against corrosive fumes at the right.

equipment. If instrument panels also carry contactors, these contactors should be removed so that the shock to the instruments resulting from contactor operation is avoided.

Pivots and bearings, particularly of pyrometric instruments, will cause trouble from misalignment or deterioration if the instrument is subjected to sudden shock or persistent vibration. A sudden jar or jolt may crack a jewel bearing, or cause the pivot to jump out of its bearing, while repeated vibration will dull pivots and reduce an instrument's sensitivity.



Incorrect and correct installation of an instrument "sensing" unit. Immersion of the unit illustrated at the top in the fluid to the point of the right-angle junction provides conditions conducive to excessive corrosion. Proper installation is shown in the lower sketch.

PROTECT FROM DIRT Next to excessive vibration, infiltration of dirt probably causes most industrial instrument trouble. Where instrument movements are particularly sensitive to foreign material that might affect their operation, they usually are provided with dust-proof cases. Such instruments should be opened as infrequently as possible, and then preferably in the instrument shop or in a room where provision can be made to keep parts clean. The slightest particle of dust or lint caught in the air gap of a millivoltmeter pyrometer, for example, can obstruct the free movement of the coil, while a metallic particle adhering to the pole pieces of the permanent magnet can stop functioning of the instrument completely.

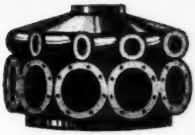
AVOID EXCESSIVE TEMPERATURES For best results, excessive temperatures, both high and low, must be avoided at the point where the instrument is installed. An instrument is built to give best operation at room temperature, approximately 70 degrees F., and prolonged use at extreme temperatures will affect the instrument's accuracy.

All instruments are subject to error in measurement if exposed to large changes in room temperature, since exact compensation for such changes, over large ranges, is uncommon. It is best to mount instruments in locations where minimum temperature changes will occur at the instrument. Instruments should not be subjected to ambient temperature changes larger than 80 degrees F.; for example, from 40 to 120 degrees F. It is preferable, however, to keep the temperature at the instrument as close to 70 degrees F. as possible.

IS *your* CLEANING OPERATION *similar to these?*

Cleaning between draws

Actex 200 in immersion tanks or industrial parts washing machines thoroughly removes the most tenacious pigmented drawing compounds—leaving no residues and causing no surface attack on the metal.



Intricate machining

Actex 200 is compounded with specific wetting agents that make possible complete degreasing and soil or smut removal from blind orifices, irregular drillings, etc.

Heat treated work

Actex 200 does a perfect job of removing quenching oil from heat treated units, either by soaker tank or machine method. Its superior oil and grease emulsifying properties assure fast, thorough cleaning.

Small steel parts

Actex 200 solution completely dissolves the film that holds metal filings, chips, etc., to threaded, knurled and like surfaces—making them easily removable in a water rinse.

These cases are typical of problems successfully solved by Actex 200. Other DuBois Products and Services are aiding War Production Plants. Send *your* problem to—

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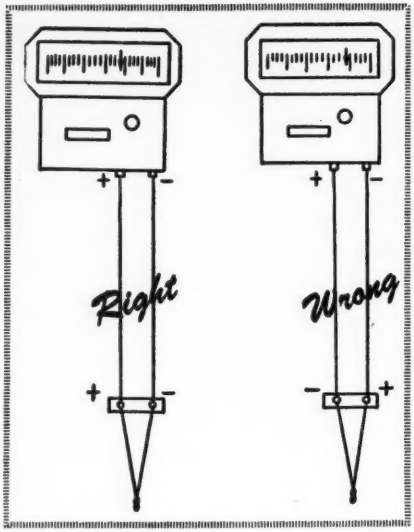


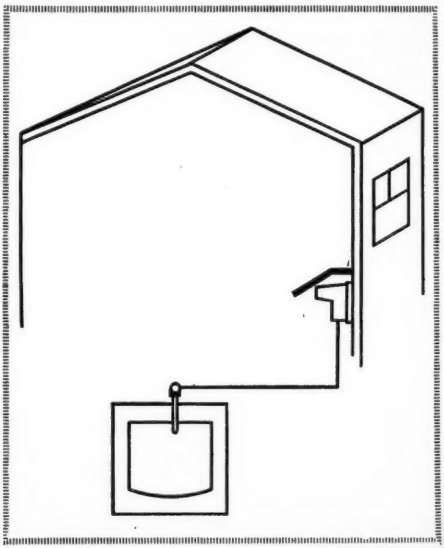
Lead wires of the instrument at the left are correct as to polarity. Improper wiring is shown at the right.

CORROSION HAZARDS Any instrument, regardless of its function, will be impaired if placed in a corrosive atmosphere. Corrosive fumes attack instrument finish, moving parts, measuring systems, and may directly result in measuring error and impaired or erratic performance. Special corrosion-proof cases are available for most instruments, but even they do not give absolute protection when the necessity of opening case doors for chart changes on recording instruments, and adjustments to other instruments, is considered. A small compressed air line connected to the case, with an escape provided through a small breather hole in the case, will properly ventilate the case and provide a slightly excess pressure within it to keep out room atmosphere at all times.

Corrosive fumes will also attack bulbs, bulb sockets, connecting tubes between bulbs and instruments, thermocouples, and lead wire. Painting bulbs and bulb sockets with corrosion-resistant paint will prolong their life. A badly corroded bulb socket should be replaced to prevent its complete failure and resultant damage to the bulb.

TUBING AND LEAD WIRES If protective tubing for capillaries of filled-system instruments is damaged, wind with tape to prevent further deterioration. Carefully remove any sharp kinks in the tubing. If tubing or lead wires run near the floor, build a housing over them or fasten them securely to some solid object where they will not interfere with, or be disturbed by, passing traffic. In the absence of metal conduits for protecting capillary tubing between bulb and instrument, wooden strips can be employed to give the same protection.

Lead wires from thermocouples or pyrometers, or sensing elements of



A shield over an instrument, particularly one installed near a window that may be open from time to time, will provide protection against water drips or moisture that may enter the window during a rain.

JEEPS INFRA-RED FINISHED in Minutes instead of Hours!

Nothing works like INFRA-RED to speed up industrial baking, drying and dehydrating

At Willys-Overland and scores of other plants where production miracles are performed daily, finishing that would take hours by old air-drying and baking methods is speeded into *minutes* with Infra-Red.

Instead of drying slowly inward from the surface, infra-red rays penetrate deep into lacquers, paints and enamels to start instant baking *from the inside out,* thus preventing surface film and saving up to 95% time in many applications.

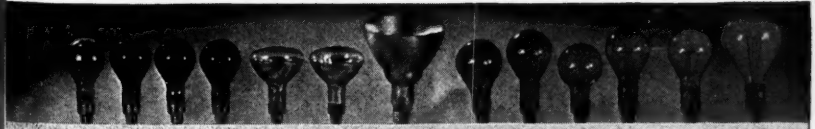
Birdseye Infra-Red is so much better, faster, cheaper, easier to use that Bulldog Electric, Curtiss-Wright, Allis-Chalmers, White Motors, Allison (G. M.), Dow Chemical and other national war plants have adopted its use. Costs less to install, less to operate, and less to maintain. For complete data write today for booklet P 3.

"BULLSEYE"* for 100% Control

Inside-lined with a pure silver ring, the "Bullseye" prevents "spilled rays" and saves 25% heat loss average with ordinary clear lamps

★ BIRDSEYE ★

*This is only one of thirteen Birdseye heat lamp types and sizes, including Clear, Ruby and built-in Reflector types.



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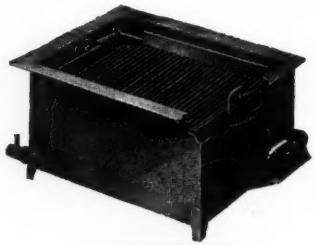
STURDY-BILT "Soaker-Hydro" METAL PARTS CLEANER
Continuous Production

Combines long "soaking - process" plus Hydro washing Action for large production. Parts are loaded onto trays, passed through the "soaking tank"—then are rinsed to remove oil film and clinging chips — then subjected to a power wash. They are removed dry and ready for use or for the next manufacturing operation. Simplicity is the keynote of construction as well as operation. Send for complete details.



"SIMPLEX" METAL PARTS CLEANER

This small, compact, automatic and mechanically simple Unit combines the two most positive methods of cleaning Metal Parts, Assemblies, Shells, Cartridges, Castings, Stampings, etc. A swishing action positively removes all grease, oil, dirt and metal chips that have been loosened during the "chemical action" of the "soak." Can be installed in different departments or in a series—one unit for cleaning, another for rinsing or rust prevention coating and others for special requirements. Send for "Simplex" bulletin for complete details.

Sturdy-Bilt Equipment Corp.
DEPT. P-3 WEST ALLIS, WIS.

other instruments, should be located so they will not be snagged by workmen, passing trucks or cranes. Examine insulation regularly, and take steps to prevent its abrasion. Worn or cracked insulation can be taped, and connections should be checked to make sure they are tight. Locate lead wires away from flames, hot gases, hot pipes and water or oil drips.

AVOID EXCESSIVE MOISTURE Exessive moisture will often harm industrial instruments. For installations where moisture cannot be avoided, a protecting case is recommended.

Do not expose instruments to strong magnetic fields.

When installing or relocating instruments, make sure all connections have been made exactly as specified in the instructions. All connections must be tight and free from dirt and moisture. Clean the contacts and terminals often.

Charts for recording instruments should be stored in a cool, dry place. Keep charts flat, preferably in their original package, until used. When recording instruments are out of service for any length of time, shut off power to the instrument and remove ink from the pens.

Pressure Instruments

Pressure instruments frequently require special attention as their vital measuring elements usually are exposed to the material undergoing pressure treatment. This material usually fills the measuring system, and may cause trouble unless the installation is properly made.

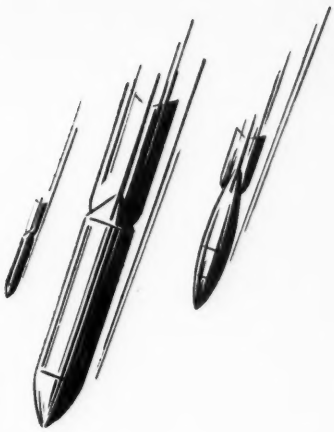
PROTECTION OF MEASURING ELEMENT The material being processed may seriously corrode the element, may solidify in the measuring system at the ambient temperature, or it may deposit heavy tars which would clog the measuring element. Protection

ACP PRODUCTS and PROCESSES

- for greater output
- better painting
- savings in critical materials

in the production of

SHELLS and BOMBS



DEOXIDINE's ability to eradicate rust chemically has been long recognized. In the munitions industry today, as in the sheet metal industry in the past, it eliminates laborious hand operations for rust removal, speeds production, and leaves metal surfaces prepared properly to receive paint.

Pickling provides a quick, easy and economical method of removing scale, and this operation is made safe and efficient by the addition of RODINE, the acid inhibitor, to the pickling bath.

The ACP Alkali Cleaning System utilizes RIDOLINE in spray or dip method to speed production . . . followed by diluted DEOXYLYTE to counteract alkalinity. Critical materials are conserved for more important uses by substituting this ACP Process.

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All along the industrial battlefront ACP Products and Processes are helping. LITHOFORM coats galvanized iron to hold paint; FLOSOL is an exceptional soldering flux for many metals; KEMICK holds to and protects metal surfaces even when heated red-hot; CUPRODINE to provide dense, bright copper coating on steel by simple immersion.

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from these conditions may be obtained by use of a diaphragm seal mounted below the gage, with the bourdon tube of the instrument and upper diaphragm housing filled with glycerin or oil.

FLUID PULSATION PROTECTION Fluid pulsation is another cause of inaccuracies and short life of pressure instruments. A rapidly pulsating pressure will destroy the accuracy of the delicate sector-and-pinion movement by wearing the gage teeth and bearings. A shut-off valve placed ahead of the gage, and throttled until the pulsation disappears, will overcome this condition, but may result in clogging of this very small opening. Gage snubbers have been introduced to provide the same result. One type employs a large number of small passageways with changes in direction, in another, the inertia of a moving piston prevents rapid pulsation, while a third type employs a rubber diaphragm with the gage tube filled with glycerin, the latter throttled by passing through a felt retainer.

OVER-RANGE PROTECTION Be sure that the instrument has ample over-range protection to prevent blow-out at any pressure likely to be applied to the equipment or line. It is good practice to allow a margin of 100 per cent more range than necessary to measure normal operation pressures for the equipment.

Insulating Varnish Catalog. A profusely illustrated, 36-page varnish guide now being issued by The P. D. George Company, 5200 N. Second St., St. Louis, Mo., contains data on more than 40 different materials. Each item is graphically described in easy-to-read charts. Along with the essential technical information offered are striking illustrations of production and laboratory operations. Copies are available on request.

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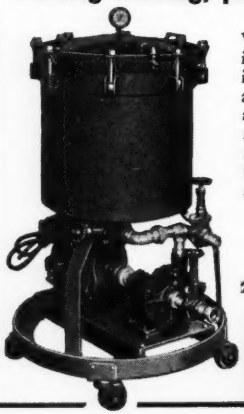

With the stepped-up current densities in plating solutions, proper filtering is now more essential than ever. The agitation of solutions stirs up the grit and metallic solutions at the bottom of the tank, causing surface roughness and more buffing. Streamlined Sparkler filter units operate smoothly and efficiently — and at greater flow rates. Mobile filters utilizing all filter aids, doing work that is always uniform and of the highest quality. Capacities 60 to 10,000 G.P.H.

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Stop Off—
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Now you can stop off any plated metal either in acid or alkaline solution . . . Just two BUNATOL quick drying chemical resistant Stop Offs will meet every plating need . . . No. 474 RED for hard Chromium and any acid solution . . . No. 608 BLACK for cyanide Copper, Tin, Silver, Zinc or any alkaline solution.

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● There was plenty of time to save the plant . . . even after the flames caught the edge of that puddle of oil.

But someone hit the blaze with a water stream. Ten minutes later you could see the flames all over town.

In your shop you should have men who can handle extinguishers . . . who can pick the *right* one when fire strikes. Training provides the answer. *The best training is a well-run demonstration, where men see extinguishers in action, learn how to use them.*

Walter Kidde & Company is preparing a booklet—"How to Teach Fire-Fighting." It tells how to handle demonstrations effectively, how to set up fire tests, how to explain extinguisher action. Write now. We'll mail you a copy.

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Particle Size

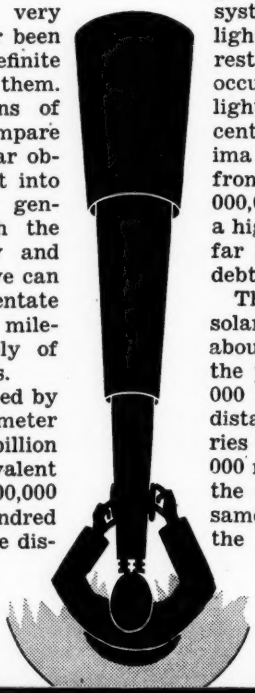
By BRYANT W. POCOCK
Consulting Editor

"For all things are relative, and if I am poor it is only because thou, Erosthanes, art richer. I too, however, am rich, for I have found others poorer than I."

CHEMICAL reactions involved in electroplating, physico-chemical processes concerned in the manufacture and application of paints, enamels, lacquers, cleaners and rust-preventatives, and the combined activities of the various agents of corrosion and rust formation make use of entities which we know as ions, atoms, molecules, particles and the like. Whereas only the very largest of these have ever been seen, we possess very definite ideas of the size of all of them.

How do the dimensions of these tiny concepts compare with those of more familiar objects, and how do they fit into the scheme of things in general? Let us start with the largest thing we know and working downward until we can go no further, let us orientate in size those dimensional milestones which are probably of greatest significance to us.

The universe as postulated by Albert Einstein has a diameter of approximately two billion light years. This is equivalent to 11,760,000,000,000,000,000,000 (eleven hexillion, seven hundred sixty quintillion) miles. The distance to the most remote nebula visible with the 100-inch telescope is something like 500,000,000 light years. The farthest nebula whose distance has actually been measured (of 18th magnitude, in the constellation Bootes) is 247,000,000 light years away.



The diameter of the Milky Way galaxy, of which our own solar system forms a part, is 50,000 light years. The earth and the rest of our family of planets occupy a position about 35,000 light years from the galactic center. The nearest star, Proxima Centauri, is 4.2 light years from us. A light year is 5,880,000,000,000 miles, which is still a higher figure than any used so far in speaking of the national debt.

The sun, the center of our solar system, is on the average about 36,000,000,000 miles from the planet Pluto. It is 92,900,000 miles from the earth. The distance from here to Mars varies from 35,000,000 to 247,000,000 miles, depending on whether the earth and Mars are on the same or on opposite sides of the sun. From earth to the

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moon it is 238,854 miles.

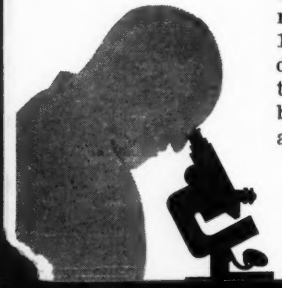
The diameter of the earth is 7,917.6 miles. Everybody knows that a mile is 5,280 feet, that there are 12 inches to a foot, and that an inch is equivalent to about 25.4 millimeters. An Angstrom unit is 1 x 10^{-7} mm., or 0.0000001 mm.

The smallest particle visible to the naked eye is 0.05 mm. or 500,000 A. in diameter. The Hertzian waves, by means of which radio signals are propagated, range from 2,200,000 A. to about 12 miles in length. Those electromagnetic waves comprising infra-red radiation are from 8,000 to 4,200,000 A. long.

Particles of cement dust are about 400,000 A. in diameter, those of sprayed zinc dust about 150,000 A., of flour mill dust the same, of talc dust and coal dust about 100,000 A., of silica dust (the cause of silicosis) about 50,000 A. Those particles comprising the pigments of paints, enamels, lacquers, and so on, range in diameter from 10,000 to 40,000 A. Bacteria are about 10,000 A. in diameter, on the average. It is noteworthy that the diameters of all these particles are of the same order as the wave length of infra-red radiation.

At this point we enter the visible spectrum, the wave lengths of whose colors are 6,500 A. for red, 6,000 A. for orange, 5,800 A. for yellow, 5,200 A. for green, 4,700 A. for blue, 4,300 A. for indigo and 4,100 A. for violet. Between green and blue we have the figure 5,000 Angstroms, which may be the thickness of a typical electrodeposited coating of chromium.

The wave lengths of ultra-violet radiation range from about 136 A. to 4,000 A. Particles comprising fumes of ammonium chloride may be from 1,000 to 10,000 A. in diameter, whereas the particles of tobacco smoke are about 2,500 A.



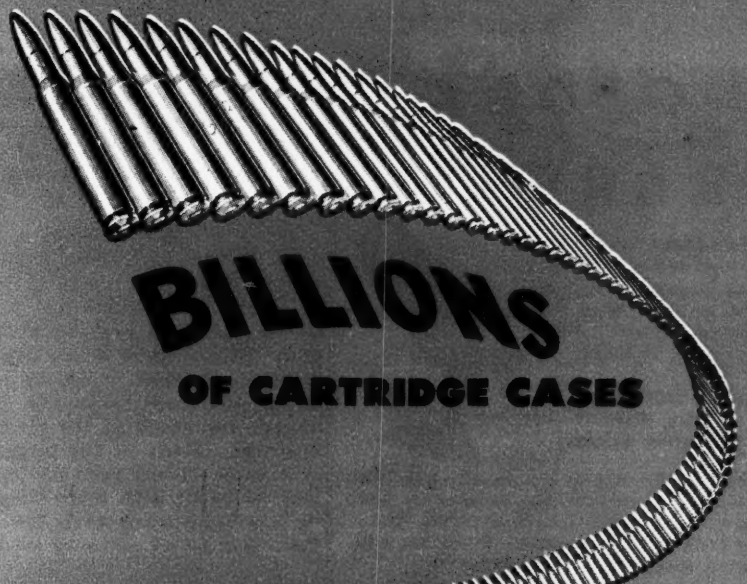
The smallest particle visible under the microscope is about 1,000 Angstroms in diameter. Secondary colloid particles run from 50 to 1,000 A. The discreet particles of the living organism known as bacteriophage are in the order of 500 A. in diameter, and those of filterable viruses are 300 A. or thereabouts. An example of the latter would be the organism responsible for the mosaic disease of the tobacco plant. This organism has been photographed through the electron microscope.

The primary colloid particle is only 20 to 200 A. in diameter. We are down to rather tiny motes by now, but there are still tinier ones to come. Molecules are known at times to arrange themselves in groups, from 50 to 100 A. in diameter. The resolving power of the electron microscope is about 40 Angstroms, so we have come just about to the limit of present visibility. That is too bad, because some of the most interesting things of all are still smaller. The fact that we can't see them, of course, makes them all the more interesting.

X-rays run from 0.1 to 150 A. in wave length. Molecules are usually between 2 and 50 A. in diameter. Atoms may range from a trifle less than 1 to about 6 A. in diameter. For example, the following are the approximate diameters in Angstroms of some representative atoms: hydrogen, 0.74; chromium, 2.6; zinc, 2.658; silver, 2.882; cadmium, 2.972; tin, 3.016; copper, 2.55; and nickel, 2.486.

The hydrogen ion has been variously estimated to be from 2.54 to 4.16 A. in diameter, Zn^{+2} from 1.48 to 1.66 A., Ag^{+} from 2.26 to 2.52 A., Cd^{+2} from 1.94 to 2.06 A., Sn^{+4} from 1.42 to 1.48 A., and Cu^{+} from 1.92 to 2.00 A. The nickel ion Ni^{+2} is about 1.56 A. in diameter, Cr^{+3} about 1.3 A., and Cr^{+6} about 1.04 A. (the last two according to different workers).

We are not yet at the end of the



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OF CARTRIDGE CASES

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PENNSALT CLEANERS
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Ten and a quarter billion rounds of small arms ammunition, President Roosevelt told Congress in his address on January 7th, were produced in 1942. This is a figure to stagger the imagination and it is something of which industry justly is proud.

The important part played by Pennsalt Cleaners in this tremendous job is, of course, a source of pride to us.

To the many cartridge case manufacturers who today are changing over from brass to steel, Penn Salt servicemen are offering valuable aid. Because of the experience gained by our trained experts, Penn Salt should be able to assist you in any cleaning problem which you may have.

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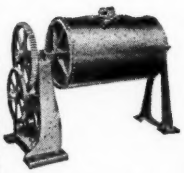
(Right)—Speeds as low as 30 r.p.m. Developed to produce fine finishes on nonferrous parts. No nicks or scratches. Quality built with compactness. Available with wood, steel or cast iron shells.

No. 6 HORIZONTAL FOUNDRY BARREL.



(Right) — Ruggedly constructed for heavy duty work such as removing fins and flanges from castings. Available in varied sizes with tight and loose pulleys or motor drive as shown.

COMPARTMENT BURNISHING BARREL.

(Right) — Performs up to three jobs at once, speeding production. Exceptionally strong and durable. Large door opening facilities loading and unloading. Belt or motor driven.

FREE! Globe's new illustrated catalog P-6 is yours for the asking. Packed full of interesting information, it demonstrates how you can slash your finishing costs. Write today!

THE GLOBE MACHINE & STAMPING CO.
1900-1950 WEST 76TH STREET
CLEVELAND · OHIO

line. Gamma rays are from 0.01 to 150 A. in wave length. The wave length of cosmic rays is about 0.0005 A. The atomic nucleus of gold is 0.0000004 A. in diameter, and that of hydrogen is 0.00000002 A.

The above is an outline of particle size. We see that those particles responsible for the reactions in which we as metal finishers are interested lie for the most part between 1 and 40,000 Angstroms in diameter. The smallest of these, including ions and atoms and most molecules, are just outside the reach of the electron microscope. Many of the largest, however, have already been photographed, and we await with more than curiosity the time when even the least of these will be on pictorial record.

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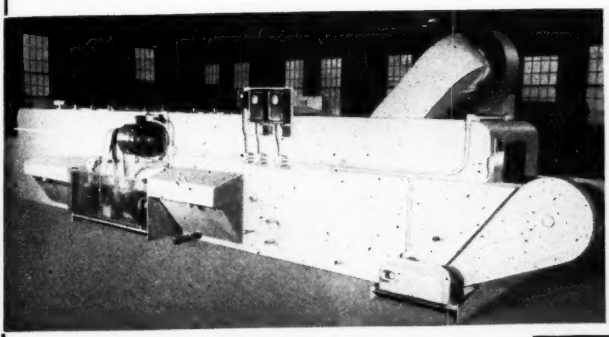
Help a man in uniform to enjoy his leisure hours. Select a few good books — books that you have enjoyed — from your shelves and leave them at the nearest collection center or your public library.

steel cartridge cases between draws and for final cleaning operations before painting and lacquering . . .

for delicate machined parts in baskets . . .

for large, fragile work placed directly on conveyor belts . . .

for a thousand and one ingenious uses when your work requires cleaning.



MACHINE shown is used to handle 75 m.m., 105 m.m. and 3 - in. anti - aircraft steel shell cases between draws and for final cleaning operations on finished cases.

N. RANSOHOFF, Inc.

1311 TOWNSHIP AVE., CINCINNATI, OHIO

Finishing Facts

Potassium Cyanide Speeds Silver Plating

IN the production of silver-plated bearings for airplane motors, the rate of plating is said to be more than trebled by use of potassium cyanide, formerly imported from Europe but now made in this country by the Electrochemicals Department of E. I. du Pont de Nemours & Company, it was recently announced.

Literally tons of silver are used each week in the fabrication of bearings which will withstand the high loads and terrific speeds demanded in modern wartime operations. According to some authorities, air speeds would be reduced as much as 75 miles an hour and loads would be cut substantially if silver-plated bearings were not available.

Potassium salts now are recovered by re-crystallization from the vast Searles Lake salt deposits in the desert country of California. These salts provide the basic material from which potassium cyanide is manufactured at a nearby plant of the Du Pont Company.

In an electroplating bath, potassium cyanide not only increases the rate at which silver plate is deposited on the motor bearings, but also gives required heavier coatings that are smooth, firmly adherent, fine grained and easily machined or burnished. Coatings of silver deposited on the bearings, some of which are three to four inches in diameter, range from three to five one-hundredths of an inch in thickness, whereas silver electrodeposits usually are measured in thousandths of an inch.

Potassium cyanide also is used in copper plating of war materials and as a nitriding agent in the surface hardening of tool steel. Before the war virtually all the potassium cyanide used in this country came from Germany. The famous Stassfurt deposits and brine deposits in Alsace were the main sources of the potassium salts from which this cyanide was made. Halt of imports because of war threatened to delay important electroplating and surface-hardening jobs until provisions were made for the manufacture of potassium cyanide in the United States.

Reclaiming Precision Gage Blocks

A CONTROLLABLE, chrome-plating process has been developed at General Electric's Lynn River Works for reclaiming precision gage blocks worn below required accuracies. The method by which the old blocks are built up is said to give them five times the wear as when they were new.

The three-step reclaiming process is performed by women. First, the

Reclaimed blocks and other working sets being checked by Margaret Dunn with the master set of blocks.

blocks are lapped 0.0002 inch undersize. Then an even coating of chrome plate 0.00015 to 0.0002 inch thick is applied to each of two working surfaces, making the blocks from 0.0001 to 0.0002 inch oversize. In the third step, the blocks are lapped to size.

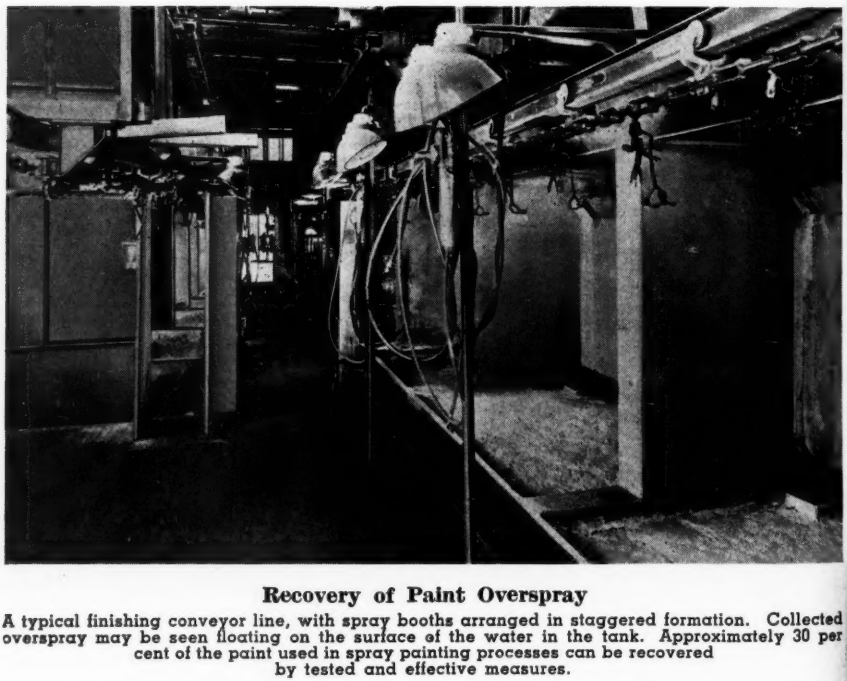
They are checked for size and parallelism on a Pratt & Whitney-General Electric electrolimit gage, and for flatness on an optical flat. Maximum tolerance over or under the required size is 0.000005 of an inch (five millionths of an inch). The average error is no more than one thousandth the thickness of a human hair. The blocks are checked periodically with a master set to make sure they are up to standard.

Mrs. Evelyn Maher, whose husband is "somewhere" with the U. S. Navy, is shown lapping one of the plated blocks to size. An expert at precision work of this type, she has been with General Electric for fourteen years.

Employee's Suggestion Increases War Production

THIRTY-FOUR employees of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., whose ideas helped increase the production of war equipment and save vital materials during 1942 were recently honored by the company. One of the winners was Joseph Watson, 32-year-old production clerk. Mr. Watson received $1,208.50, the largest single check issued in the 32-year-history of the Westinghouse Suggestion System, for discovering a way to speed production of parts for Navy circuit breakers, large electrical switches that control the flow of power on naval vessels. He recommended elimination of time-consuming brushing and polishing of two arcing contacts preparatory to silver plating. This plan was expanded to include four other parts of the circuit breakers and now the six metal pieces are prepared for plating in one-seventh of the time formerly required.

"Unified Design" is the title of a four-page folder now being distributed by Swenson Engineering Service, 2615 Twelfth St., Detroit, Mich. The folder explains how three related industrial services are now rendered by one engineering organization—the unified design of infra-red ovens, painting equipment and conveyors to form a single production unit. Swenson Engineering Service designs and builds baking, painting and conveying equipment which performs as a unit because each is designed with a full knowledge of the qualifications and limitations of the others. Copy of the folder free upon request.



Recovery of Paint Overspray

A typical finishing conveyor line, with spray booths arranged in staggered formation. Collected overspray may be seen floating on the surface of the water in the tank. Approximately 30 per cent of the paint used in spray painting processes can be recovered by tested and effective measures.

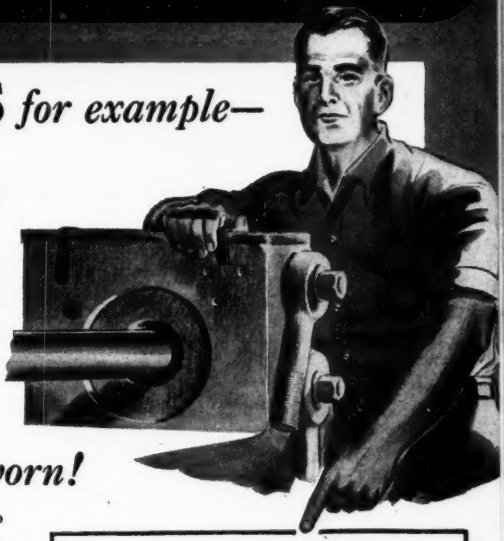
IS CHROMIUM PLATING YOUR ANSWER TO EXTENDING THE LIFE OF VALUABLE TOOLS AND EQUIPMENT?

MACHINE TOOLS *for example—*

CHROMIUM PLATING

may increase output of your cutting and forming tools . . .

reclaim them when worn!



BY applying a chromium plated surface to many types of cutting and forming tools, greatly increased service life is obtained. In addition, when worn undersize, they can be put back into production again simply by stripping, replating and grinding to size.

For example, chromium plated mandrels and dies last many times longer, reduce stoppages and speed output. Chromium plated taps—working in copper, brass, aluminum, nickel, rubber and plastics—often give 3 to 10 times increased production. On broaches and burnishing bars, chromium plating eliminates seizing, produces a finer finish and steps up service life.

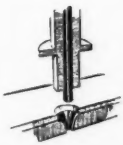
FOR MANY OTHER EQUIPMENT PARTS

This is just one of countless ways that chromium plating saves valuable materials and man-hours . . . by extending the life of a wide variety of surfaces subject to wear and corrosion . . . by reclaiming many hard-to-replace equipment and production parts which have been worn or machined off-size and would otherwise have to be scrapped. Successful applications include: — plug and ring gauges, ball and roller bearing parts, piston rods, drive shafts, cylinders, and many types of spindles fixtures and jigs.

THE BOOKLET SHOWN *will assist you in determining the applications for chromium plating on your products and equipment. A copy of "The Last Thousandth of An Inch That Speeds Production" is yours for the asking. In writing, please mention* PRODUCTS FINISHING.

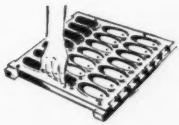
TEN TIMES LONGER LIFE FROM DIES AND MANDRELS

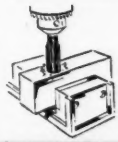
SMOOTHER, FASTER WORK FROM BROACHES AND BURNISHING BARS



WEAR AND ABRASION REDUCED ON FORMING TOOLS

MOLDING DIE LIFE GREATLY INCREASED





INCREASED OUTPUT FROM TAPS, DRILLS AND COUNTER-BORES

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Waterbury, Conn. ☆ Detroit, Mich.

News OF THE INDUSTRY

Detroit Rex Advances E. W. Allison

On the twenty-third anniversary of the founding of Detroit Rex Products Company, the annual meeting of the stockholders and board of directors was held.

Ellsworth W. Allison

At the latter meeting, Ellsworth W. Allison was elected assistant secretary of the company.

Mr. Allison received his primary schooling through Junior College in Bay City, Michigan. He attended the University of Michigan and was secretary of the 1935 Law Class, the year of his graduation. He holds degrees of A.B. and J.D. from the Literary and Law Schools respectively.

Previous to joining Detroit Rex Products Company, Mr. Allison was associated for six years with the law firm of Lucking, Van Auken and Sprague in Detroit. He is president of the University of Michigan Club of Detroit and is a member of the Detroit Boat Club.

New Representative for Mitchell-Bradford

The Mitchell-Bradford Chemical Co., Bridgeport, Conn., has announced that Protective Coatings, Inc., Detroit, Mich., through its Mr. H. Tom Collord, has contracted to represent Mitchell-Bradford in the State of Michigan, in the far West, and in certain other parts of the country. The Mitchell-Bradford Chemical Company markets the "Black-Magic" penetrating processes for blacking and rustproofing steel, iron, copper and zinc.

Ray Gourley Appointed Sales Manager of Ferbert-Schorndorfer Company

Appointment of Mr. Ray Gourley as sales manager of the Ferbert-Schorndorfer Company, Cleveland, Ohio, was announced by Mr. David Andrew, president. Mr. Gourley has had wide experience in the paint and varnish industry, having been actively associated with it for more than 18 years. He originally joined the Ferbert-Schorndorfer Com-

industry's new name for top efficiency in water-wash

*AQUA-RESTOR

PAINT SPRAY BOOTHS

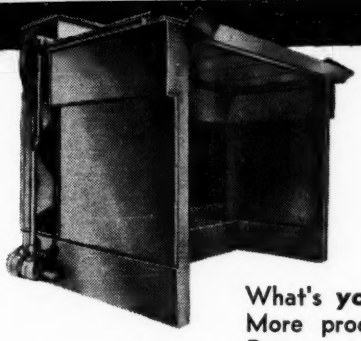


PHOTO: Floor-type Aqua-Restor Paint Spray Booth (FLRS-7); rear and side water-impingement walls. Equipped for fluorescent lighting.

*Reg.U.S. Pat. Off.

What's ***your*** paint spraying problem? More production, ***better*** production? Does your operation require greater safety for labor, and against fire? Aqua-Restor units, developed to meet high-speed high-standard War Production spraying, check high on these points. Continuous water curtain, completely controlled; no "shower" or spray; no nozzles, no moving parts—minimum of servicing required; low h. p. pumping, unusually high point reclamation. 23 standardized units; others engineered to specification, for all spraying requirements. WRITE FOR BULLETINS.

AQUA-RESTOR DIVISION

MAYER MANUFACTURING CORP.

43-47 DIVISION PLACE **BROOKLYN, N. Y.**

pany as a specialty salesman, drawing on his knowledge and success in selling insulating varnish, wire enamel and ignition cable lacquer. He advanced in the company to the position of field manager and then to his present post.

Bristol Company Announces Several Appointments

Howard H. Bristol, president of The Bristol Company, Waterbury, Conn., announces the appointment of L. G. Bean as vice president in charge of engineering and sales from the position of vice president and general sales manager which he has held since 1939. Mr. Bean became associated with The Bristol Company in June, 1920, as sales engineer. In 1921 he became district manager of the company's Boston district; in 1925 he was made Chicago district manager; in 1930 he returned to Waterbury as assistant chief engineer of The Bristol Company, and in 1935 became sales manager, later becoming vice president and general sales manager. Mr. Bean will maintain headquarters at the general offices in Waterbury.

L. G. Bean

Harry E. Beane has been named sales manager of The Bristol Company. He joined the Bristol sales engineering organization in 1920 and in 1925 was appointed district manager of the Birmingham, Ala., office. In 1930 he became district manager of the Pittsburgh district, and in 1936 was promoted to field sales manager to supervise the activities of the branch factories at Chicago, Akron and San Francisco and to supervise the work of the company's district managers, sales engineers, and service engineers throughout the country.

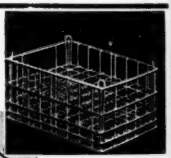
The appointment of E. L. Stilson as assistant sales manager has also been announced. Mr. Stilson joined the Bristol sales organization in 1920. After varied experience with Bristol, in 1938 he was made special sales engineer for the petroleum industry. Since 1940 Mr. Stilson has been associated with the field engineering department with headquarters at Waterbury.

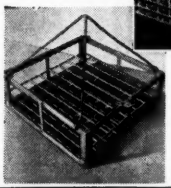
New York Office of Mixing Equipment Company Moves

Mixing Equipment Company, Inc., has shifted its New York office from 377 Broadway to 136 Liberty St., New York City. Glenn J. Moorhead, formerly Pittsburgh representative for the company, has assumed the position of East-

BASKETS *and* CONTAINERS
of all kinds — for all purposes

Regular manufacturers of baskets and containers for handling shells and all types of defense equipment.
Send us your basket problems.
Specialists in our work for over 40 years.
Write for folder.





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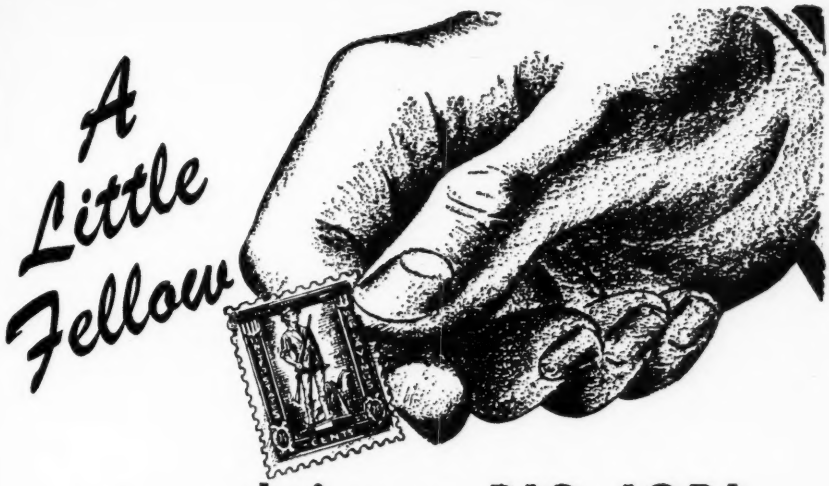
AMERICAN Wire Form COMPANY, INC.
271-275 Grant Ave. Jersey City, N. J.



. . . . doing a BIG JOB!

INHIBITEX for PICKLING

◀◀ is another!

A pure organic compound inhibitor perfected for use in plating cycles but equally good for heavy duty pickling . . . Special characteristics make it particularly applicable to war production—speedy and economical.

★ Soluble in alkaline plating solutions without harm to solution.

★ Safely removes rust or scale without etching adjacent surfaces.

★ No refinishing necessary when used to remove zinc plate from steel.

★ Does not form colloids or unsoluble acid compounds.

★ Leaves smut free, bright surface on malleable or cast iron.

★ No loss of metal or deformation when removing heat treat scale and oxidation.

★ FOR STRIPPING OF ANODIZED COATINGS *MAC DERMID* HAS RECENTLY INTRODUCED METEX "FS" and METEX No. 2.

Two entirely different types of materials for stripping anodized coatings. Choice of type depends on equipment available. Write for free data sheets.

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New York Cleveland Los Angeles
Chicago Detroit St. Louis
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MAC DERMID
INCORPORATED
WATERBURY, CONNECTICUT

ern Divisional Sales Manager with headquarters at the new location. C. F. Donovan will continue his duties as manager at the New York office.

The home office of the Mixing Equipment Company, Inc., is at 1024-1040 Garson Ave., Rochester, N. Y., where the recently expanded factory is also located.

Spring Meeting of The Electrochemical Society

Of special interest to a large group of chemists and engineers will be the Spring Meeting of The Electrochemical Society which will be held in Pittsburgh, Pa., on April 7th, 8th, 9th and 10th. On Thursday afternoon, April 8th, a session will be devoted to Automatic Control Devices which are used in various industries, including the metal finishing field. Supplementing this session will be a display of devices, with particular emphasis placed on those which have been developed in recent years.

The subject of Dielectrics will be discussed at the session on Friday, April 9th. The field of Dielectrics has witnessed an unusually rapid advance in recent years. This session will also be supplemented by samples and exhibits.

The Saturday meeting will be concerned with the subject of Corrosion; an afternoon round table discussion will be held on "Combatting Corrosion." This topic is of prime importance at present in the electrochemical field. Today there are in existence installations composed largely of metal which have been giving complete satisfaction; such structures would have been condemned less than ten years ago.

The headquarters of the meeting will be the Hotel Roosevelt; due to the large demand for rooms, it is advisable to make reservations well in advance.

War Product Finishing Keynotes DeVilbiss School

Wartime finishing methods will be the keynote of the first-half 1943 schedule of the DeVilbiss Training School for industrial spray operators announced by The DeVilbiss Company, Toledo, Ohio.

The first session started on February 22nd; subsequent sessions will start on March 22nd, April 19th, May 17th and June 21st and continue for one-week periods. Classes are open to all users to DeVilbiss spray painting equipment. There is no tuition fee; no obligation is incurred on the part of the individual or the firm represented.

The training course will include class and shop instruction in the use and care of equipment and other phases of wartime finishing practices. The growing demand for faster application of essential protective war coatings and the problems of labor turnover and manpower shortage make the DeVilbiss Training School a timely help in filling an urgent need of industry. Further information and reservations can be obtained from The DeVilbiss Company.

Cincinnati A.E.S. to Hold Regional Meeting

The Cincinnati Branch of the American Electro-Platers Society has planned a regional meeting to be held on Saturday, March 27th. The meeting will include a dinner at the Gibson Hotel, Cincinnati, at 7:30 P. M. After the dinner, addresses will be given by two well-known speakers. An informal party will follow.

Reservations should be made in advance with Mr. Al Foreman, R. R. No. 9, Box 313, Cincinnati, Ohio.

Dr. A. J. Cofrancesco Joins Stanley Chemical Technical Staff

The Stanley Chemical Company, East Berlin, Conn., announces the addition to its technical staff of Dr. A. J. Cofrancesco, who will devote his efforts to the field of synthetic chemistry and the development of rubber-like materials.

Dr. Cofrancesco graduated from Wesleyan in 1933, receiving his B.A. with distinction in chemistry and his M.A. in 1934. During 1934 and 1935 he was with the Guggenheim Corporation of New York and the following two years were spent in the laboratory of The Stanley Chemical Company. In 1939 he received his Ph.D. from the Yale Graduate School of Chemistry, and for the past three years has been associated with the Calco Chemical Company.

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THE MODERN BLACK FINISH FOR STEEL

Pentrate

PHOSPHATE AND OIL BLEND

A CHOICE, NOT A SUBSTITUTE

Thousands of steel items for military and civilian use looked first to Pentrate for a good available protective finish. Today, if other types of finishes were available most of these products would continue to use Pentrate — their choice because of performance. The photo-micrograph, made in an impartial laboratory, shows the actual penetration of this finish.

HEATBATH CORPORATION

SPRINGFIELD, MASSACHUSETTS

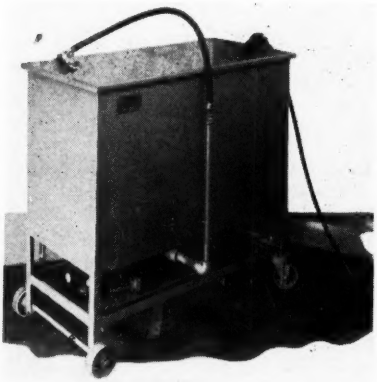
PATENTED

New PLANT EQUIPMENT AND Materials

Circo All-Metal-Parts Cleaner

A portable all-metal-parts cleaner, Model 361820, for cleaning of metal parts and assemblies of any type has been placed on the market by Circo Products Company, 2835 Chester Ave., Cleveland, Ohio.

The Circo All-Metal-Parts Cleaner is



Circo All-Metal-Parts Cleaner

equipped with strainer to filter metal chips and other foreign solid particles. The strainer is easily removed for cleaning without emptying the machine and without loss of cleaning liquid, and assures longer use of cleaning fluid. No replacement cartridges are required.

Circo All-Metal-Parts Cleaner may be used with any cleaning solvent or compound, hot or cold, but will work faster and better when the solution is heated. The unit is furnished complete with electrical thermostatically controlled immersion heater, work rest screen, flusher and hose. Packless pump is directly connected to standard electric motor.

To operate, parts are placed in tank and switch to operate the pump is turned on and a constant flow of cleaning liquid flushes the work until it is clean. Contents can be easily emptied through drain cock or by use of pump to direct and dispose of the cleaning fluid wherever desired.

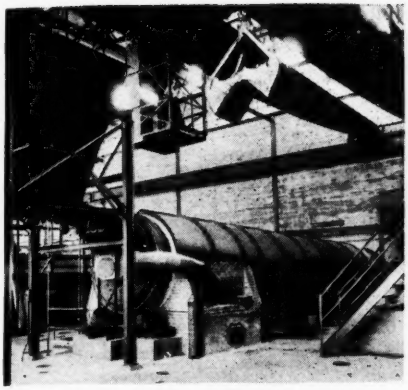
Christie Indirect Dryer

A new rotary dryer designed for use in drying fine mesh materials has been placed on the market by L. R. Christie, 17 E. 42nd St., New York City. This new dryer, to be known as the Christie Indirect type, is constructed in such a manner that the furnace gases do not come in direct contact with materials to be dried.

The Christie Indirect Dryer consists of a metal drum which, in order to obtain increased heating surface, is divided into compartments. The metal drum is enclosed in an insulated steel casing that utilizes the entire surface of the outer shell for additional heating surface. It may also be used as a rotary retort and distilled gases recovered, or drying done in an inert atmosphere.

All openings, it is said, are closed against infiltration of air. By patented construction, the operation of charging and discharging are continuous. All bearings are claimed to be anti-friction, totally enclosed and self aligning.

Due to the total absence of draft, in,



Christie Indirect Dryer

over, and around the "charge," the dryer is said to handle materials of —300 mesh without appreciable dust loss and, by slight modifications, objectionable odors from the materials are said to be destroyed.

Any nature of fuel or heating medium may be used and efficiencies of better than 60 per cent are said to be obtained. Recirculation of furnace gases give easy control of temperatures and improved efficiency.

Sterling 1000 Electric Sander

Sterling Tool Products Company, 363 E. Ohio St., Chicago, Ill., recently announced the Sterling 1000 Electric Sander designed and built to meet every requirement for heavy-duty service. Features are said to include a fully streamlined balanced and counterbalanced vibrationless unit, compact in size, with a handle designed to comfortably fit the hand of either men or women operators with snap action switch located on handle convenient to the operator's thumb.

The Sterling 1000 Electric Sander is powered by 1/5 h.p. universal motor cooled by a turbine type fan. The motor is protected from dust by a replaceable filter screen. Gears and counterpoise mechanism are sealed in a dustproof cartridge type gear case. Moving parts are supported by oversize ball and needle type bearings, plus one sintered bronze bearing.

A quickly detachable sanding pad operated by simple latch type lock takes

How Metso Cleaners prevent waste

LESS DOES MORE

Metso is also saving money in busy metal working plants. Its efficient alkali plus soluble silica, valuable cleaning aid, produces chemically clean parts quickly.

In a shop doing nickel and copper plating, cleaner baths prepared with Metso used only 2.9 lbs. per 1000 sq. ft. as against 4.4 lbs. for the other cleaner.

Increase your production economically with Metso Sodium Metasilicate or Sodium Sesquisilicate.

METSO CLEANERS
SODIUM METASILICATE
SODIUM SESQUISILICATE

PHILADELPHIA QUARTZ CO.
General Offices: Ionic & Third Sts., Phila., Pa.
Chicago Sales Office: 205 West Wacker Drive
9 Plants Distributors in over 65 Cities

ECONOMICAL BASIC SOLUBLE SILICATES

one-third sheet of standard abrasives and is made flexible to permit sanding on curved or flat surfaces. Tumbler action clamps, operated by key, screw-

Sterling 1000 Electric Sander

driver, and so forth, lock the abrasive sheets on the sanding pad. New orbital motion sanding action is said to produce maximum cutting and leave a completely smooth sanded surface on wood, composition, or metal. The Sterling 1000 will also perform many lapping and polishing operations when a felt or cloth matrix is used on the sanding pad.

Ransohoff Single Stage Washing Machine

N. Ransohoff, Inc., 1311 Township Ave., Cincinnati, Ohio, announces a single stage washing machine which can be used to advantage by sub-contractors as well as makers of complete units.

The machine is designed and built to meet the demand for a fast-acting, thorough-cleaning machine to remove oil and chips from work such as machined shafts of standard or special shapes during inter-process operations. It is adaptable to use for cleaning parts of many descriptions and, if desired, can be equipped with perforated baskets for cleaning delicate small parts. It is also said to be practical for removing rust-proofing oils from parts which have been shipped from sub-contractors to plants where the complete units are made.

The outstanding feature of the machine shown in the illustration is the

TURCO Specialized INDUSTRIAL CHEMICAL COMPOUNDS

TURCO PRODUCTS, INC., manufactures more than 225 Specialized Industrial Chemical Compounds which have been designed for production speed-up on almost every operation in the plant. In preparation for anodizing or chromatizing; for phosphatizing; for spot welding and weld masking; for degreasing and decarbonizing of machine parts and similar operations in nearly every department of the plant, there is a thoroughly tested Turco material.

Ask us for technical information. Call on your local Turco Field Service Engineer for free consultation or submit your problems to our Research Laboratory Engineers direct for ideas and production short cuts. No obligation. 54-23

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FOR SALE!

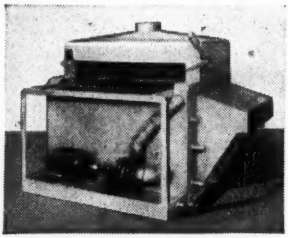
This is our peace-time stock of various baking enamels and assorted paint materials. We want to sell at once—at our actual cost—*no priorities needed!* Take all or any part. All this material in excellent condition. Wire or write us!

QUANTITY	DESCRIPTION	MANUFACTURER
49 gals.	Brown Polymix No. 76, Baking Enamel	Ault & Wiborg
55 "	White Polymix No. 76, Baking Enamel	Ault & Wiborg
286 "	Ivory Polymix No. 2071, Baking Enamel	Ault & Wiborg
161 "	Black Polymix, Baking Enamel	Ault & Wiborg
275 "	VX White Enamel, Baking Enamel	Pratt & Lambert
164 "	White Synder Enamel, Baking Enamel	Kay & Ess, Dayton
55 "	Ivory Synder Enamel, Baking Enamel	Amsco Products
61 "	Ivory Morocco No. 9712, Baking Enamel	Kay & Ess, Dayton
10 "	Clear Morocco No. 9734, Baking Enamel	Kay & Ess, Dayton
25 "	VX-147 Red Enamel, Baking Enamel	Pratt & Lambert
10 "	VX White Enamel, Baking Enamel	Pratt & Lambert
95 "	Pink Topcoat, Synthetic Air Dry	Zapon Company
92 "	Blue Topcoat, Synthetic Air Dry	Zapon Company
110 "	Synder Reducer	Kay & Ess, Dayton
55 "	Amsco Thinner	Amsco Products
108½ "	144 VX Reducer	Pratt & Lambert
55 "	L-362 Bronzing Liquid	Cincinnati Varnish Co.
54 "	C-4000 Clear Platers' Lacquer	Ault & Wiborg
275 "	L-3721 Clear Platers' Lacquer	Cincinnati Varnish Co.
25 "	Aluminum Lacquer	Pratt & Lambert
18 lbs.	L-3426 Aluminum Paste	Cincinnati Varnish Co.
55 gals.	2280 Clear Platers' Lacquer	Pratt & Lambert
54 "	Paraffin Oil	Cincinnati Oil
106½ "	Methyle Chloride	R & R
108 "	Paco Solvent	
40 "	Regular Thinner	Ault & Wiborg
35 "	White Silk Screen Paint	Sherwin-Williams
1 "	Transparent Base Silk Screen Paint	Sherwin-Williams
2 "	Purple Silk Screen Paint	Sherwin-Williams
10½ "	Fire Red Silk Screen Paint	Sherwin-Williams
2½ "	Ultramarine Blue Silk Screen Paint	Sherwin-Williams
93 "	White Shellac	
153 "	Orange Shellac	
3 "	Mahogany Stain	
75 "	Brown Woodyouth	
30 "	Solvent to be used with Woodyouth	

NuTONE, Incorporated

THIRD AND EGGLESTON AVENUE **CINCINNATI, OHIO**

special carriage which consists of V-shaped brackets. The section of the brackets which comes in contact with



Ransohoff Single Stage Washing Machine

the work is lined with brass so as to prevent scratching of the most highly machined surfaces.

Surbrite Surface Conditioner

A steel surface conditioner to be known as Surbrite, now being marketed by the Hanson-Van Winkle-Munning Co., Matawan, N. J., is said to have created wide interest in the metal products manufacturing and finishing industries.

In addition to being an inhibitor, Surbrite is a surface brightener and is designed for use with either sulfuric or muriatic acid pickles. Surbrite is available in two forms—"H" and "S". Neither form is a wetting agent. In acids, Surbrite will not increase foaming tendencies, according to the manufacturer. In some cases, such as large tanks with poor ventilation, a foam blanket might be helpful, mainly to save heat and reduce gas annoyance; but in all cases, controlling the pickling with Surbrite is a major step in reducing acid foam annoyance. Surbrite "H" and "S" are said to provide highly desirable surfaces along with high efficiency in acid use and metal saving.

King Plating Barrel

An improved plating barrel, having a wood woven cylinder adaptable to any barrel plating tank, was recently announced by John King and Sons, 48 Springfield St., Dayton, Ohio. The bar-

BUCKINGHAM COMPOUNDS

NOW USED IN

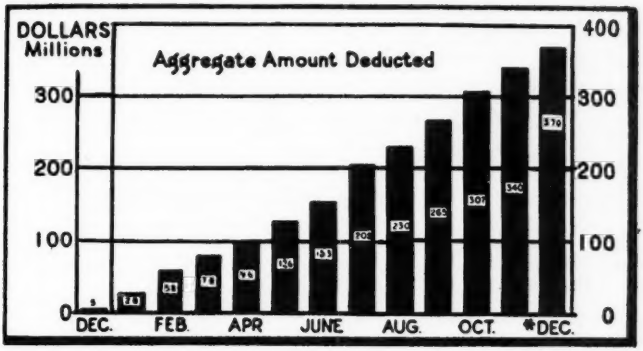
WAR PRODUCTION

BURRING • GREASELESS
HARDENED STEEL COMPOSITION

Samples Shipped Promptly

The Buckingham Products Co.
8900 HUBBELL AVENUE DETROIT, MICHIGAN

Tomorrow's SALES CURVES ARE BEING PLOTTED Today!



*Approximate

THIS CHART SHOWS ESTIMATED PARTICIPATION IN PAYROLL SAVINGS PLANS FOR WAR SAVINGS BONDS

(Members of Armed Forces included, starting August 1942)

There is more to this chart than meets the eye. Not seen, but clearly projected into the future, is the sales curve of tomorrow. Think what $4½ BILLION per year in War Bonds, saved through the Payroll Savings Plan, will buy in the way of *brand new consumer goods tomorrow.*

Here indeed is a solid foundation for the peacetime business that will follow Victory. But there is still more to be done. As our armed forces continue to press the attack in all quarters of the globe, as war costs mount, so must the record of our savings keep pace.

Clearly, on charts like this, tomorrow's Victory—*and tomorrow's sales curves*—are being plotted today.

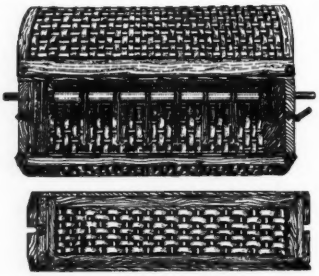
Save with

EVERYBODY EVERY PAYDAY 10%

War Savings Bonds

This space is a contribution to America's all-out war effort by
PRODUCTS FINISHING

rel is shown in the accompanying illustration. It is claimed that due to the wood woven construction of the King Barrel, it is possible to obtain greater agitation without rattling the work, al-



King Plating Barrel

though there are 34 points of agitation in the 16-in. diameter model.

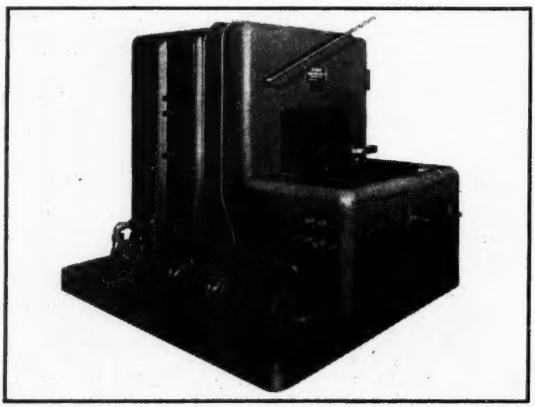
The barrel cover is made flat so that with each revolution the work is completely rearranged. Flat work will not cling or stick to the uneven surface of the barrel, thereby preventing streaks spots, and burns. The close weave of the wooden mesh cylinder permits the handling of small work. According to the manufacturer, maximum interchange or flow of the solution through the weave is provided. It is also claimed that more metal is deposited to the work in less time, thereby enabling work to be plated in a minimum of time.

American Tumbl-Spray Metal Washing Machine

A batch type, small parts washer, designed around an endless tumbling belt, was recently announced by American Foundry Equipment Co., 555 S. Byrkit St., Mishawaka, Ind. The American Tumbl-Spray Metal Washing Machine receives and discharges the parts to be cleaned through a large front opening. It is similar in its action to the rotary drum type cleaning machine in that the work is tumbled to expose all surfaces to the cleaning action of the sprays.

The open type barrel provides access to the parts while in process and the spray system is also readily accessible for cleaning and inspecting the pipes and nozzles. The American Tumbl-Spray Metal Washing Machine is especially adapt-

CLEAN AIRCRAFT PARTS...



Clean aircraft parts are essential to the precision manufacture of fighters, bombers, et cetera for the American armed forces. The compact and efficient wash and rinse unit shown is ideal for washing intricate motor propellor hub parts as well as many other similar parts. The parts revolve before high pressure sprays which clean every surface and recess quickly and thoroughly.

Other types of metal cleaning and finishing machines for all types of processing will be gladly explained by Howard sales engineers who are at your service.

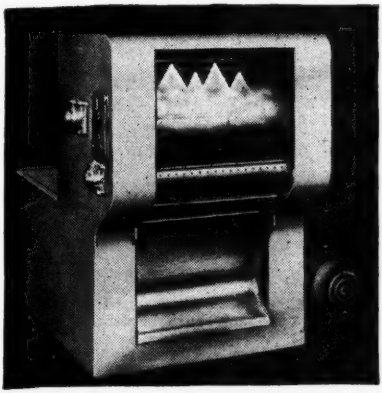
Write to:

HOWARD ENGINEERING & MFG. CO.

1056 HULBERT **CINCINNATI, OHIO**

ILLUSTRATED CATALOG ON REQUEST

ed for cleaning small screw machine products which can withstand a slight tumbling action. Where the parts are



American Tumbl-Spray Metal Washing Machine

handled in batch form, parts can be washed only, or the wash can be followed with a fresh water rinse with the

McKeon's

"Liquid Sulphur"

REMOVES COPPER PLATING

SAMPLE FREE

Sulphur Products Co., Greensburg, Pa.

ANTI-SPATTER

Welding Aid

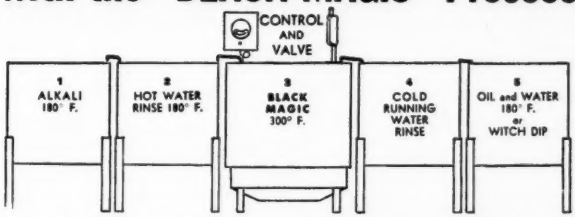
Eliminates Metal Finishing

INDUSTRIAL CHEMICAL PRODUCTS CO.

DETROIT

Milwaukee **Fort Wayne**

How to Black . . . in One Bath with the "BLACK-MAGIC" Process


CONTROL AND VALVE
1 ALKALI 180° F.
2 HOT WATER RINSE 180° F.
3 BLACK MAGIC 300° F.
4 COLD RUNNING WATER RINSE
5 OIL and WATER 180° F. or WITCH DIP

Accepted on Ordnance and other Government contracts calling for black oxide finish.

The "Black-Magic" Process produces a chemical reaction for blacking all steel (except stainless) **in one bath.** This rich blue black becomes part of the steel and cannot be rubbed off, will not fade, chip or peel. It will withstand heat up to 1000° F. without changing color.

With this process any job can be completed in from 4 to 15 minutes and saves 50% to 90% in time over other methods. It costs from ½ to 1 cent per pound of metal, including labor, material and fuel.

Write for complete catalog.

Also
MAGIC-ETCH
WITCH-DIP
BLACK-MAGIC
ZINC BLACK

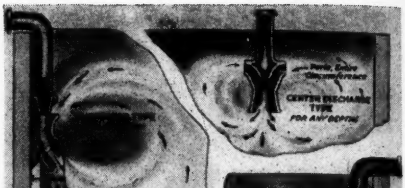
Mitchell-Bradford Chemical Co., **Bridgeport, Conn.**

rinse water draining to a sewer to prevent contamination of the washing solution.

Another layout provides a power wash and a power rinse followed with a compressed air blow-off to remove excess liquid. A special arrangement keeps the two solutions separate and permits washing and rinsing in one compartment without transfer of the parts. To unload the machine, the mill is run in reverse which will discharge all parts over a chute.

Duriron Steam Jets

Three corrosion-resistant circulating steam jets have been announced by The Duriron Company, Dayton, Ohio. In addition to being corrosion-resisting, the jets are said to have the advantage of fitting snugly to the inside walls of either square or circular tanks, with a maximum projection of 4½ in. The suspended and center discharge types may be used in tanks of any depth. The floor type is adaptable for tanks of any depth up to 60 in. All types are so designed as to give complete agitation and circulation of the tank contents.



Sectional Views of Three Duriron Corrosion-Resistant Steam Jets

Made of the high-silicon iron alloy, Duriron, or the special stainless steel, Durimet, the jets are said to be highly efficient for heating acid solutions, dissolving powdered or lump chemicals, and for the digestion of ores and separation of sludge acids.

Hercules Resins

Hercules Powder Company, Inc., Wilmington, Del., has recently announced several developments of interest to the finishing field. The first of these is Hercules Alkyd Solution No. 57, a resin film-former composed of drying oil, modified phthalic alkyd which fortifies resins to increase drying speed and durability of oil paints. It is used in the manufacture

ROLOCK
PROCESSING CARRIERS

Minimize
REJECTS . . .
In Bonderizing 40 mm. Steel Shell Cases.

This basket is designed specifically to have a minimum bearing area against the shell cases, which are loaded mouth down. This and other special designs of crates, trays, fixtures, and so forth, speed and improve production.

Recommendations on request from your details of operation.

ROLOCK, INC.
1400 Kings Highway East, Fairfield, Conn

BETTER PLATING, LESS COST!
"MGC" ELECTROPLATING EQUIPMENT
Write for Interesting Details TODAY!
MOTOR GENERATOR CORP., HOBART SQ. BOX PF 33 TROY, OHIO

of faster-drying, more durable oil base paints for metal and wood surfaces. Hercules Alkyd Solution No. 60, a resin film-former made of drying oil-modified phthalic alkyd, provides a flexible, durable base for marine finishes and is used in the manufacture of exterior and interior finishes to comply with Navy and Maritime Commission requirements.

A resin film-former made of drying oil-modified phthalic alkyd to give a quick-drying, durable base for lustreless finishes on metal, designated as Hercules Alykyd Solution No. 88, is used in making exterior and interior lustreless finishes to comply with Army requirements for trucks, tanks, and so on. Used in the manufacture of quick-transportation finishes, Hercules Alkyd Solution No. 41 is a resin film-former made of drying oil-modified phthalic alkyd to provide a quick drying, durable finish.

The name "Pentalyn M" has been given to a drying oil-soluble resin composed of modified pentaerythritol ester of rosin which provides a raw material for preparation of quick-drying durable varnishes with linseed oil and other drying oils. It is employed in the production of varnishes for clear and pigmented coatings for metal or wooden surfaces.

-for Fast-Finishing

"INDIAN BRAND" POLISHING ABRASIVE

For nearly forty years we have been producers and refiners of abrasive grains, serving the industry with a strictly quality product for all particular abrasive applications.
Accurately Graded — Thoroughly Cleaned — Greater Capillarity — Longer Wear.

Send for trial lot—FREE!

Indian Brand Polishing Abrasive
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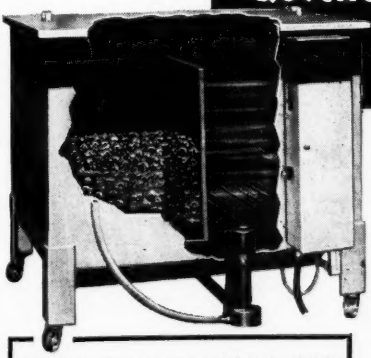
THE HAMILTON EMERY & CORUNDUM CO.

Chester, Massachusetts

Quicker, better Degreasing with ***LESS LABOR***



with this NEW PHILLIPS PORTABLE VAPOR DEGREASING MACHINE

Here is the perfect portable degreaser with many exclusive advantages. Eliminates hand work. Reduces parts damage. Quickly removes all oil and grease from all types of work by improved vapor method. Efficient solvent can be used over and over.

Self-contained, Electrically heated and controlled —No water lines—No steam lines—No gas lines

degreasing operations can be carried on at point of production. Saves cost and time of transportation. Speeds up production.

Special Shell DEGREASING UNIT

Designed to degrease inside and outside of 20 to 75 mm. shells. Automatic conveyor system. Handles 100 to 5000 per hour. Portable or stationary models. *Write for full details.*

WRITE FOR CATALOG

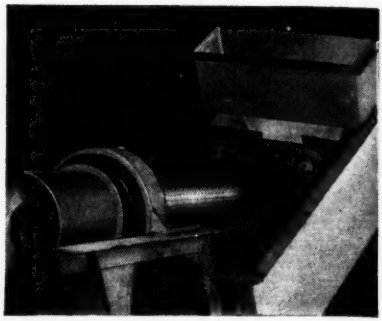
giving full details on various sizes and models for degreasing loads from 10 lbs. to 10 tons—with or without power driven flushers. Special machines for special jobs.

PHILLIPS MANUFACTURING COMPANY 3478 W. Touhy Ave., CHICAGO, ILLINOIS

Spiralveyor

The illustration shows the Spiralveyor, developed by Salem Engineering Company, Salem, Ohio, and used for removing large quantities of heat treated parts from the quench. When small stampings or forgings leave the discharge end of a furnace and enter the quench, the Spiralveyor not only removes them from the quench but also conveys the parts to a pickling unit at a rate of 8,000 lb. per hour.

The unit is an inclined 18-in. diameter perforated steel tube through which a spiral conveyor screw operates and carries the parts up through the tube and out of the quench. Since the wall of the tube is perforated with $\frac{9}{32}$-in. holes,

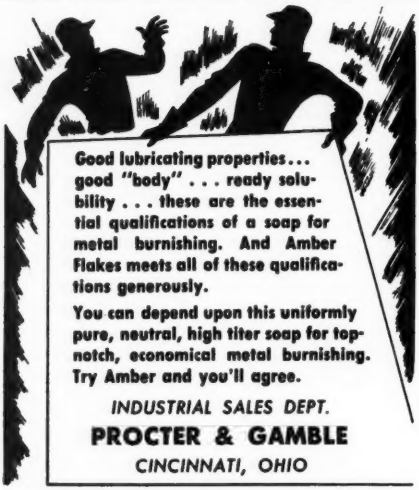


Spiralveyor

all the water is tumbled out of the components. This permits the parts to enter the pickling solutions without diluting the bath with water from the quench.

The Spiralveyor is said to be of practical value when used in connection with heat treating furnaces; however, it will undoubtedly find other applications in connection with high speed war production equipment.

AMBER FLAKES
for efficient, economical
METAL BURNISHING!



Good lubricating properties... good "body" . . . ready solubility . . . these are the essential qualifications of a soap for metal burnishing. And Amber Flakes meets all of these qualifications generously.

You can depend upon this uniformly pure, neutral, high titer soap for top-notch, economical metal burnishing. Try Amber and you'll agree.

INDUSTRIAL SALES DEPT.
PROCTER & GAMBLE
CINCINNATI, OHIO

Flexible Wood Link Matting

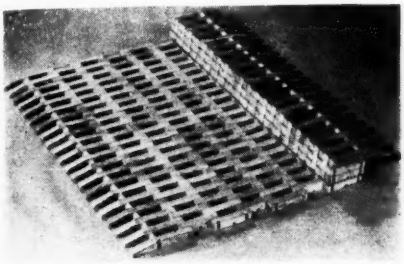
The development of substitute materials in the manufacturing of matting became a necessity when rubber and other materials were put on the critical list, if the safety, sanitation and comfort features of matting were to continue available. The research staff of

HARSHAW
ANODES AND
CHEMICALS

Give excellent finishes and uniform deposits of cadmium, silver, nickel, chrome, zinc, lead and other metals for every kind of plating.

THE HARSHAW CHEMICAL CO.
Cleveland, Ohio, and Principal Cities

the American Mat Corporation, 1796 Adams St., Toledo, Ohio, has developed a number of acceptable substitutes, all of which have been subjected to gruelling factory tests to prove the ability



Flexible Wood Link Matting

to withstand abuse way beyond that encountered in common usage.

A recent development—flexible wood link matting—has been announced by American Mat Corporation. This mat is substantially constructed of wood links, is light in weight, and can be rolled or folded up for easy handling and cleaning. Lying flat, it follows the contour of the floor.

Flexible wood link matting makes for safety underfoot, is comfortable to stand on, and affords good drainage. The ends are beveled to reduce the danger of tripping. It comes in natural wood color. The mat is 1 in. thick, and is available in stock sizes of 18 x 32 in., 24 x 38 in., and 30 x 44 in. However, it can also be obtained in special sizes of any length and up to 36 in. in width. The matting is said to be particularly applicable for use around machinery, in factories, on oily and greasy floors.

To help in conserving present matting through proper care, the company has set up a special service and advisory department for the duration. Detailed literature is available upon request.

Mine Safety Appliances "Fend"

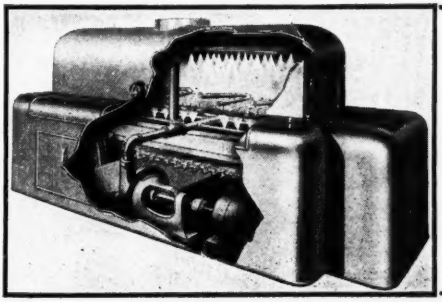
Announcement of M. S. A. "Fend," industrial skin creams and lotions for barrier protection of the worker's skin against industrial dermatitis, of interest to industrial medical directors, safety engineers, and plant executives concerned with checking the urgent problem of industrial dermatitis and keep-

THOSE PERFECT PARTNERS FOR PICKLING

NEP and SUMFOAM

TO CONTROL ACID AND FUMES IN THE PICKLING DEPT. SAVE ACID, METAL AND WORRY. ELIMINATE FUMES AND HEADACHES.

THE WM. M. PARKIN CO. • Highland Building, Pittsburgh, Pa.



HYDRO-FLOW
Industrial Washing Machines

Streamlined design. Hidden motors, pumps and pipes are easily accessible. Piping and nozzles located to insure thorough cleansing of all surfaces. Rugged and efficient pressure pump. Corrosion resistant spray nozzles—from mist to open stream. Monorail, Belt or Gravity type conveyors designed to carry any shape or size material. Variable speeds on conveyor drive synchronize production.

International Conveyor & Washer Corp.
Write for circular.
640 E. FORT ST. DETROIT, MICH.

ing men and women on the job without loss of time and production, has been made by Mine Safety Appliances Company, Braddock, Thomas and Meade Sts., Pittsburgh, Pennsylvania.

Fend creams and lotions are stated to provide a protective barrier on the skin against many specific hazards in industry. Consisting of cosmetically-safe materials, Fend creams are medically correct, easy to apply, and are bland and neutral. Offering no interference with the normal action of the skin glands, the creams are said to protect and are emollient to the skin; are readily removed with mild soap and warm water.

Each of the six different types of Fend products provides protection against a number of specific skin hazards. These types are the result of intensive research into the problems of industrial dermatitis.

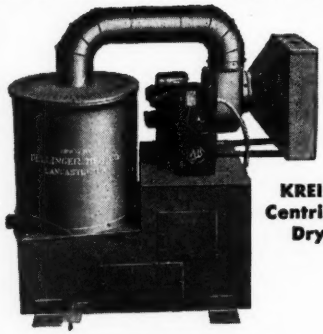
Women's Heavy Duty Steel-Grip Gloves

Inasmuch as women workers are being called on more and more daily to

Steel-Grip Glove No. 12517

handle rough, sharp, jagged materials that not only wear out ordinary work gloves very quickly but subject their

SPEED DRYING WITH EASILY OPERATED



KREIDER Centrifugal Dryer

Cuts Cost and Improves Quality of Plated Work

One worker can easily operate this modern high-speed drying outfit. Electric welded, all-steel construction. V-belt drive. ¾ H.P. motor for efficient, economical operation. Controls include fast-acting foot brake and reversing drum switch. *Auxiliary heating unit available.*

Write for complete information and prices.

DELLINGER MFG. CO., 729 N. Prince St., Lancaster, Pa.

USE

McKeon's *"Liquid Sulphur"*

For Removing Copper Plating

1. Remove surface grease from work. 2. Immerse in 12% McKeon's "Liquid Sulphur" solution. 3. Rinse in cold water. 4. Immerse in 20% sodium cyanide solution. 5. Rinse in cold water.

Write for free sample.

SULPHUR PRODUCTS CO.

GREENSBURG • PA.

For a real good polishing job use

KEYSTONE EMERY

TURKISH — NAXOS — AMERICAN

KEYSTONE EMERY MILLS *Write for Sample* **4316 Paul St., Phila., Pa.**

hands to dangerous cuts and injury, The Industrial Gloves Company, 746 Garfield Blvd., Danville, Ill., has adapted one of their steel reinforced gauntlets for women's wear.

Designed on a small, comfortably-fitting pattern, the gauntlet is made of sturdy chrome tanned leather, reinforced on all wearing surfaces with steel ribbons diagonally placed for utmost protection against cuts and snags. All seams are sewed closed with steel thread. The thumb wearing surface and the junction of the palm and thumb are reinforced with extra leather and steel ribbons for added protection and wear. The glove may be supplied with a 2-in. band instead of the gauntlet type pictured.

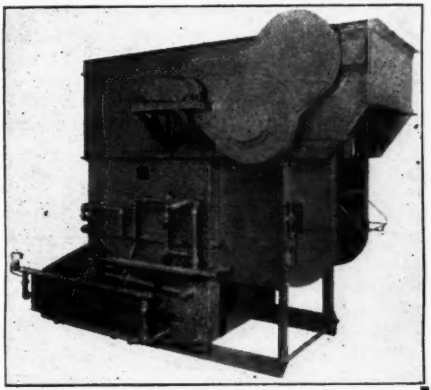
"Primer of Industrial Scrap"

The Business Press Industrial Scrap Committee, Room 3303, Empire State Bldg., New York, N. Y., has prepared and is now distributing a booklet entitled "Primer of Industrial Scrap." The booklet is intended for the further education of industry in its effort to back up the war program by the segregation

YOU NEED
SPEED

IN YOUR METAL CLEANING
IN YOUR PRODUCTION
AND —
IN YOUR WAR WORK

We must all put in our best efforts to get the job done *now* and here is how you can speed up your production. For 100% efficiency in metal degreasers and metal parts washing machines, Blakeslee has always been and still is tops. Throughout the country, in all types of War Work, our equipment is doing its share toward increasing our country's war production. Wire, phone or write for our engineer or quotation.



The above machine is a compact, speedy automatic degreasing machine requiring the smallest amount of floor space. Used for degreasing fuse parts and mechanisms.

G. S. BLAKESLEE & CO.
NEW YORK CHICAGO TORONTO

and sale of manufactured and dormant scrap. It is divided into five chapters under the following headings: The Why and Wherefore of Scrap; Plant Salvage—Good Business; Scrap Definitions; Government Ceilings and Dealer Scrap Prices, and Statistics. One rule advocated by the committee is, "If it hasn't been used for three months, and if someone can't prove that it's going to be used in the next three months—find a use for it—or scrap it!"

Any executive who is interested in the booklet may obtain a copy by addressing a request to the committee at the address given above.

Mercury War Products. Mercury Chemical Company, Inc., 2706 David Stott Bldg., Detroit, Mich., has issued a folder describing Mercury War Products which are designed for faster and better surface conditioning of metals in war industries. Products discussed include Mercury No. 9 Cleaner for aluminum and magnesium, Mercury No. 15 Aluminum De-Oxidizer and Anodizing Stripper, Mercury No. 45 Cleaner for aluminum forgings, Mercury No. 6 and No. 6W Cleaner for ferrous metals, and Mercury No. 5 and 5W for cleaning and brightening brass, copper and ferrous metals. Sections are also devoted to "Mercurizing" with Mercury No. 18 and the Mercury Method of surface conditioning aluminum for spot welding.

Copy free upon request.

Davis Safety Extension Light. A safety extension light which is said to be absolutely safe against electric shock, even when the guard is removed, is the subject of Bulletin No. 1403 now being issued by Davis Emergency Equipment Company, 45 Halleck Street, Newark N. J. Copy free upon request.

Engineering Properties of "K" Monel. Bulletin T-9 which describes in detail the engineering properties of "K" Monel has been issued by The International Nickel Company, Inc., 67 Wall St., New York, N. Y. Topics presented in the 16-page publication include the following: Composition, Physical Constants, Properties, Working Instructions, Thermal Treatment, Corrosion Resistance, Mill Products, Range of Mill Sizes, and Applications. Copy free upon request.

Testing finishes simplified by Taber ABRASER

Comparative tests for adhesion, wearability and toughness of paint, lacquer, enamel, electroplate and similar finishes are accurately made from four-inch specimens. Results totalled on built-in counter in terms of wear cycles. *Write for Bulletin 2014.*

TABER INSTRUMENT CORP.

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Modern Precision. Vol. 2, No. 2 of "Modern Precision" which is published by Leeds & Northrup Company, 4908 Stenton Ave., Philadelphia, Pa., is now available. This well-illustrated publication contains many interesting application stories on various L & N precision instruments. Copy free upon request.

Spray Equipment. An interesting 32-page, 8½ x 11 booklet entitled "Eclipse Spray Equipment on the Job" has been issued by Eclipse Air Brush Co., Inc., and may be compared to taking a sight-seeing trip to learn how the other fellow handles his spray problem. The large pictures of actual spray operations in various industries such as shipbuilding, aircraft, baking (spraying grease on bread pans), machinery, leather, structural steel, and munitions, will give the reader some idea of the scope of the equipment's application.

The Eclipse Air Brush Co., Inc., 400 Park Ave., Newark, N. J., will be glad to send a copy of the booklet free to anyone requesting it on his company letterhead.

Opportunity Section

PLATING BARRELS WANTED

Plating barrels wanted — 14 x 36 or larger, Udylite, Hanson Van Winkle or any other popular make. Write Box 100, Products Finishing, 431 Main St., Cincinnati, Ohio.

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All sizes in stock 6"-14". Largest stock in country. Loose, Sewed and Flannel Buffs.

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WANTED: Plating Chemist or Engineer to take charge of Industrial plating in a new plant in Eastern Massachusetts. In replying, state age, draft status, education, experience and salary desired. Box 19, Products Finishing, 431 Main Street, Cincinnati, Ohio.

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Complete line of quality Production Finishes; shell coatings, finishes for aircraft and aircraft accessories, tanks, synthetic coatings and finishes for manufactured products of all types. Our products are approved by U. S. Army, Navy, Maritime Commission, Air Corps, Corps of Engineers, Chemical Warfare Service and all Government Departments and Agencies.

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This Opportunity Section is available for classified advertisements featuring equipment, employment, business opportunities, etc., in the industries devoted to the cleaning, plating, polishing and finishing of metals. For advertising rates and other information address:

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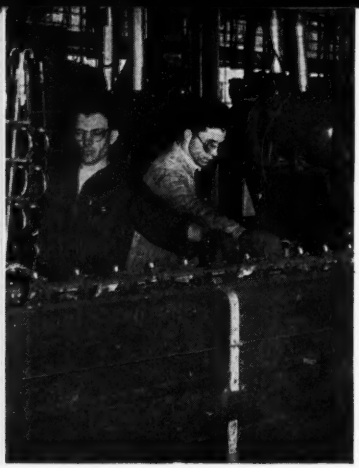

FOR YOUR Catalog LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Shell Cleaning with DuBoy Products

A data sheet describing the soaker tank method with Actex 200, the solvent method with Actusol, and the industrial washing machine method with Actex 200 is now being distributed by The DuBois Company, 1120 W. Front St., Cincinnati, Ohio.

2. Speed Production

A booklet containing information about a new technique of grinding, finishing, and polishing that offers increased production to finishing departments is now being issued by Minnesota Mining & Mfg. Co., Forest and Fanquier Sts., St. Paul, Minnesota.

3. Metal Cleaning Equipment

A four-page folder which illustrates and describes a well-rounded line of equipment for cleaning war products such as cartridges, gun barrels, shells and similar products is now being issued by the Alvey-Ferguson Company, 162 Disney St., Cincinnati, Ohio.

4. Rolock Specialized Processing Carriers

In a four-page catalog, Rolock, Inc., 1400 Kings Highway E., Fairfield, Conn., presents its line of industrial baskets, crates, trays, and fixtures.

5. Pentrate—the Modern Finish for Steel

One of the most beautifully illustrated catalogs issued by the Heatbath Corporation, P. O. Box 78, Springfield, Mass., describes the Pentrate Phytanium Blended finish for steel products of all kinds.

6. Howard Cleaning and Finishing Equipment

A 33-page catalog which describes and illustrates 28 types of widely adaptable product finishing equipment is now being issued by the Howard Engineering & Manufacturing Co., 1056 Hulbert St., Cincinnati, Ohio.

7. Spray Booth Cleaning Compounds

Triad WS and WSF spray booth cleaners for use respectively in booths where oil base paints and enamels are sprayed are described in a new leaflet issued by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Michigan.

8. High Pressure

A new house organ containing a review of recent developments in fire protection and in the handling of compressed gases is now being published by Walter Kidde & Company, Inc., 631 West St., Bloomfield, New Jersey.

9. Dresinate for Extra-Action Metal-Cleaning Compounds

The Hercules Powder Company, Inc., Delaware Trust Bldg., Wilmington, Del., is now issuing an eight-page catalog, telling how the Dresinate method of metal cleaning will help prevent cleaning baths from becoming bottlenecks in the production line.